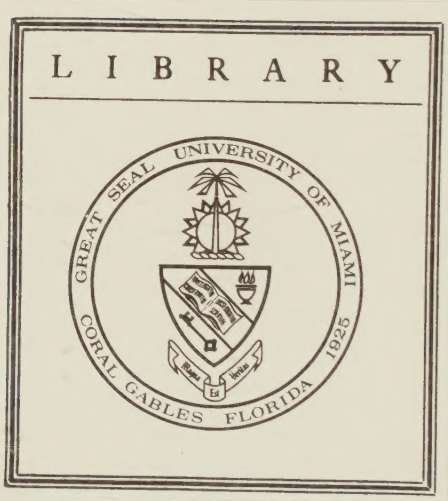
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RHYNCHOPHORA

OR

WEEVILS

OF

North Eastern America

BY

W. S. BLATCHLEY AND C. W. LENG

Rhynchophora or Weevils

OF

North Eastern America

BY

W. S. BLATCHLEY and C. W. LENG

"Their shape would make them, had they bulk and size,
More hideous foes than fancy can devise;
With helmet heads and dragon scales adorned,
The mighty myriads now securely scorned,
Would mock the majesty of man's high birth,
Despise his bulwarks, and unpeople earth."

Acheta Domestica, 1851.

1916

The Nature Publishing Company

INDIANAPOLIS

EARLY REFERENCES TO WEEVILS.

THERAPONTICONUS.—"Where now shall I find curculio, the parasite?"

CAPPADOX.—"In some wheat with greatest ease I'll make you find five hundred curculios."

Plautus.—"Curculio, or the Forgery." About 196 B. C.

"The wheat which is not turned is eaten with wiuels."

Guevara, Letters, 1577.

"About this time it chanced a pretty secret to be discouered to preserue their corne from the fly or weauell, which did in a manner as much hurt as the rats."

Quoted in *Capt. John Smith's* Works, II, 161.

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INTRODUCTION.

This work was begun by the senior author, W. S. Blatchley, as a continuation or supplement to his "Coleoptera or Beetles of Indiana," published in 1910. After about one-third of the manuscript had been completed the junior author, Chas. W. Leng, wrote that he had a similar work in progress on the Atlantic Coast species of Rhynchophora and proposed that the two works be combined and the geographical scope enlarged so as to include the United States and Canada east of the Mississippi River. After due consideration the arrangement of a joint authorship was agreed upon, the works as begun were merged, enlarged and mostly rewritten, and the book as issued is the result.

The only other general work on the weevils or snout beetles of the region covered by this book is that entitled "The Rhynchophora of America North of Mexico," issued in 1876 by LeConte & Horn. This work is now out of print and difficult to obtain. While excellent in its plan and scope, its most serious defect is that many species described by Say, Schönherr, LeConte and other authors previous to 1876 are not redescribed but only mentioned and their synonymy cited, thus compelling the student to search through many additional works in order to name his species.

As in the "Beetles of Indiana," the primary object of the authors has been to furnish to students and tyros in Entomology a simple manual which would enable them in the most direct way possible to arrange, classify and determine the scientific names of the weevils in their collections. With this object constantly in view many statements relating to synonymy and many of the subdivisions in use by other authors have been omitted in order to render the work less technical and more easily followed by the beginner.

Following the plan adopted in the "Beetles of Indiana," keys to families, subfamilies, tribes, genera and species have been made an important part of the present work. These keys are based on the more salient or easily recognized characters separating the divisions to which they pertain. In most instances, to avoid repe-

tition and save space, these characters are not re-mentioned in the descriptions which follow, and the keys should therefore *always be used in connection with the descriptions.* Moreover, it should be remembered that the characters used and statements made both in keys and descriptions are to be considered as applying only to those species occurring in the territory covered by this work. They may be, and in general are, capable of much wider application but it is not safe to assume that such is the case.

Following the description of each species are notes on its distribution, food habits, etc. The general range or area of distribution given is based not only on the personal collecting of the authors in Florida and their own and adjoining states, but also on the specimens which they have examined in other cabinets and on the published local lists cited in the Bibliography as well as manuscript lists furnished by a number of persons. While it has been the aim to verify, where possible, the names of all doubtful species included in these lists, it has not always been possible to do so and the range as given, especially where it extends beyond our territory, is to be considered as open to correction. The dates of occurrence as given are usually the earliest and latest at which the species has been noted in the locality cited and do not therefore necessarily show the actual time of its appearance or disappearance.

The measurements are given in millimeters or decimals thereof. Since the beak of a weevil is often deflexed or folded beneath the body, the measurement has been taken only from the front margin of the eye or head to the tips of the elytra or pygidium where the latter extends beyond the elytra.

The number in parenthesis before the name of each species is that of the Henshaw "List of the Coleoptera of America North of Mexico" or the Third Supplement to the same.

The classification used is mainly that of LeConte & Horn in the work above cited, modified where necessary by the recent studies of Casey, Hopkins, Pierce and certain European authors. The descriptions have been written as far as possible from the specimens themselves, in connection with the original descriptions. In the Scolytidæ this has not always been possible, and the descriptions in that family are in part compilations from preceding works.

No effort has been spared to secure accuracy in identifications, the senior author having visited Cambridge, New York, Philadelphia and Washington for the purpose of comparing

doubtful specimens with the types, and with those of the larger public and private collections. Little attempt has, however, been made to reduce to synonymy the more feebly differentiated forms previously described for, in the present stage of our knowledge of the life history of many species, personal opinion would necessarily be the principal guide in such action, and of insufficient weight to justify arbitrary declaration. The principal synonyms necessary to connect this with preceding works on the Rhynchophora are given and the extent of the information available as to each species is indicated in the data accompanying the distribution.

In the division of the work of preparing the manuscript the senior author has prepared all the keys and descriptions except in *Balaninus* and Scolytidæ, and has reviewed the entire work. The illustrations and proof reading have also had his personal attention. The majority of the new species have been described by him, are signed (*W. S. B.*) and are to be accredited to him alone. The junior author has supplied the key and descriptions of the species of *Balaninus*, much of the matter relating to the distribution of the Atlantic Coast species, especially in Centorhynchini, the primary divisions into the subfamilies and tribes, as well as the chapters on Scolytidæ and the Bibliography. The species which he has described and signed (*C. W. L.*) and two which have been communicated by Dr. Hopkins and signed (*A. D. H.*) are to be accredited to each of these authors respectively. Unless otherwise stated the types of the new species are in the private collection of their author.

The principal works used in preparing the pages that follow are listed in the Bibliography at the end of the book. The taxonomic works used for each tribe are also always mentioned, as in the "Beetles of Indiana" at the commencement of our treatment of the tribe or other subdivision. Following the name of each species, however, the text gives usually only the name, or its abbreviation, of the author and date and page of his original description, the full title of the work where it appeared being given in the Bibliography. A number of short papers, treating mainly of economic phases, have been omitted; these will be found in the Bibliography of Economic Entomology by Samuel Henshaw and Nathan Banks.

The work of preparing these pages has been a pleasant task to the authors, the specimens recalling many scenes and inci-

dents attending their capture, for most of the species treated have been personally collected. As we discussed together the minutiæ of classification, interruptions caused by memories of the swamps and rocks of Labrador and Newfoundland, the woods, rivers and lakes of Indiana, or the pine regions and hammocks of Florida, would disturb the work, for we could not entirely forget the living forms in our study of their dead remains.

The universal kindness we encountered from many old friends as the work progressed also added greatly to the pleasure of the task. It may be hard to single out a few to specially thank for their help, but we cannot omit Dr. Leland O. Howard, Mr. Samuel Henshaw and Dr. Henry Skinner, who each permitted the examination of valuable specimens in their care; Mr. Andrew J. Mutchler who, by permission of Dr. Frank E. Lutz, never wearied in working out bibliographical tangles through his knowledge of the books in the American Museum library. A host of private collectors have sent us distribution data and specimens for examination; among them Messrs. Wm. T. Davis, Lewis B. Woodruff, Ernest Shoemaker, Geo. P. Engelhardt, E. A. Bischoff, H. W. Wenzel, C. A. Frost, P. G. Bolster, Norman Easton, H. P. Loding, R. W. Harned, C. J. Ouellett, John D. Sherman, Jr., Harold Morrison, Harry Dietz and Harry H. Knight have been most kind. Prof. J. Chester Bradley put the Cornell University collection including that of R. J. Crew, at our disposal, as did also Emil Liljeblad, of Chicago, his private collection. All the Florida records of Mrs. Annie Trumbull Slosson and Dr. E. A. Schwarz were also copied. Col. Thos. L. Casey, H. C. Fall and Chas. Dury have also kindly compared specimens for us with types in their collections and have furnished us information or data regarding many others, while Dr. S. A. Forbes and his assistant, Chas. A. Hart, Dr. E. P. Felt and F. L. Washburn have greatly favored us with the loan of books and illustrations. It is a pleasure to acknowledge and extend thanks for such assistance and to recall especially the golden days spent in Washington with Pierce and Barber, and above all Dr. Schwarz, whose aid in multitudinous ways can never be forgotten.

The difficulty of the task and the imperfections that, in spite of all care, mar its fulfillment are plainer now than they were when we commenced to write this work. Perhaps if we had then known as much about Rhynchophora as we do now, we should never have started. Without dwelling upon these difficulties,

we beg the reader to bear them in mind in judging the result, hoping that our book may be of service to him in spite of its shortcomings, and that it may serve eventually as the foundation for a better one.

EXPLANATION OF STRUCTURES USED IN THE CLASSIFICATION OF RHYNCHOPHORA.

As set forth by LeConte and Horn (1883, p. XXIX) and by the senior author in his "Coleoptera of Indiana" (p. 25), the suborder Rhynchophora is separated from the suborder Coleoptera genuina, by having the head more or less prolonged into a beak; palpi rigid and labrum absent (except in Anthribidæ and Rhinomacerinæ); gular sutures confluent on the median line and the prosternal sutures wanting. The names of the principal external parts used in this work in the classification of Rhynchophora are shown in the accompanying figure.

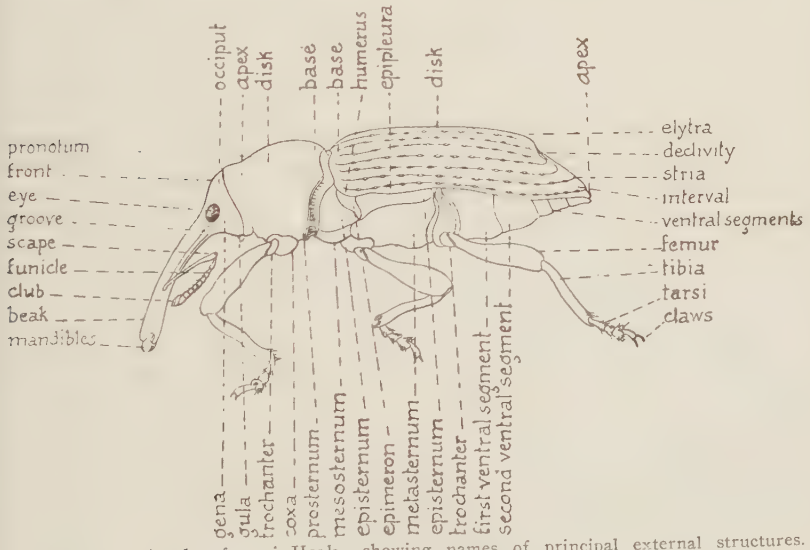

Fig. 1. *Pissodes fraseri* Hopk., showing names of principal external structures. (Adapted from Hopkins by Edw. D. Harris.)

Many details are omitted in this figure for the purpose of showing more clearly the names of the principal parts to which constant reference will be made in the text. Figures showing all external parts in greater detail will be found on a later page under the family Scolytidæ.

The names of the parts of the head are shown in Fig. 2, drawn on a larger scale.

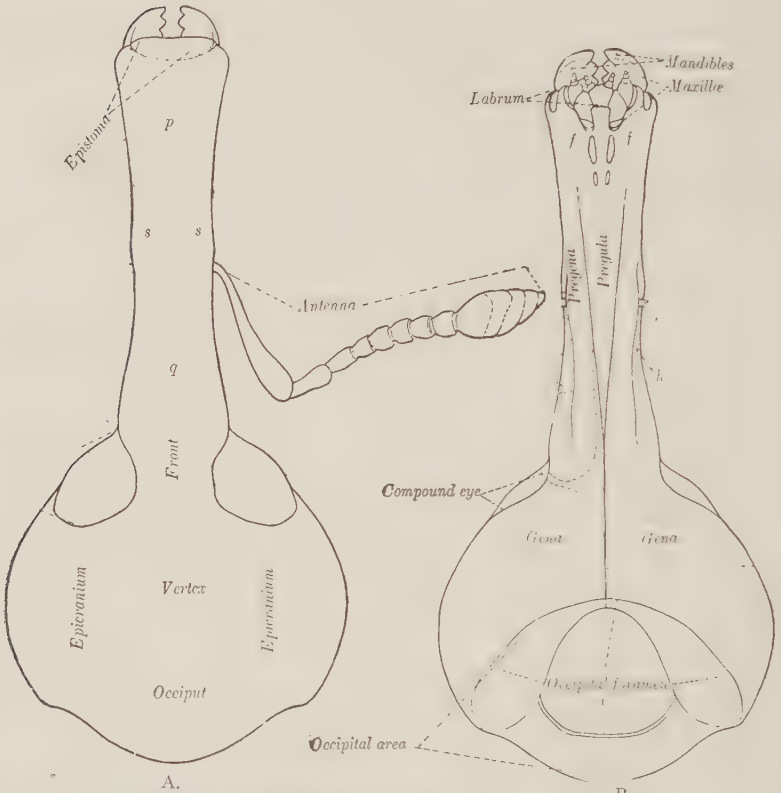

Fig. 2. A, Upper view of head and beak of *Pissodes strobi*; *p*, hind section or base of beak; *s*, dorsal area of beak; *f*, front section or apex or tip of beak. The mandibles are seen projecting beyond the epistoma. Fig. 2, B, lower view of same; *h*, antennal groove or scrobe; the gular suture is seen as a vertical line between the gena. (After Hopkins.)

On a still larger scale the parts of the mouth are shown in Fig. 3.

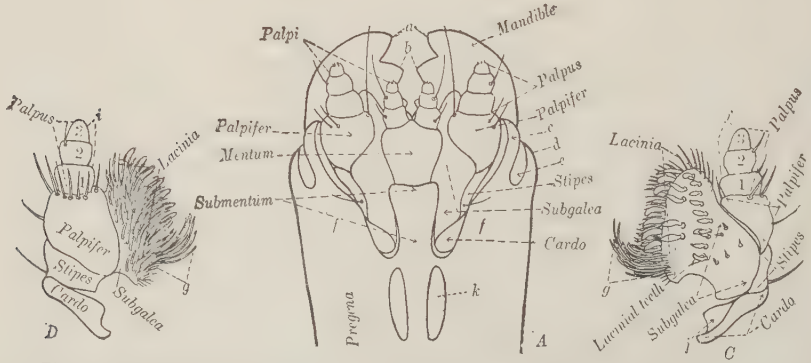

Fig. 3, A, Apex of beak of *Pissodes strobi*, greatly magnified to show details of mouth parts; *a*, apical tooth; *b*, subapical tooth; *c*, lateral view of hypostoma; *d*, pleurostoma; *e*, mandibular scrobe; *f*, hypostomal area; *k*, hypostomal puncture; C and D, maxillæ; *g*, lacinial bristles; *i*, joints of palpi; *j*, fossa of cardo. (After Hopkins.)

It should be understood that the mouth parts are often so concealed in the apex of the beak that dissection as well as magnification are necessary for inspection.

In the figures that precede, it will be noted that there is a single median gular suture and that the palpi are short, rigid, and conical, the joints successively diminishing in size. We introduce at this point a figure of the head of *Pterostichus* for the purpose of showing thereby the pair of sutures which limit the gula in the Coleoptera genuina and also the flexible character of

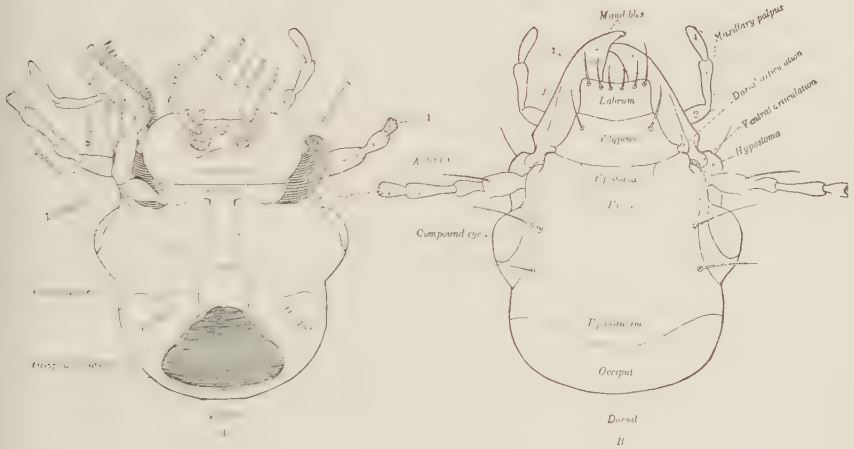

Fig. 4. *Pterostichus californicus.* A, lower view of head; B, upper view of head. (After Hopkins.)

the palpi. These are the constant characters which separate the Rhynchophora from the other Coleoptera, which were treated in the "Coleoptera of Indiana." There is no exception to the gular suture character known to us, and but few to the palpi; these are, however, less rigid in the family Anthribidæ and subfamily Rhinomacerinæ, which therefore occupy a relatively low rank and approach more nearly the normal Coleoptera.

The most obvious character of the Rhynchophora, the one to which they owe their common name of snout beetles, is the beak or rostrum. It is very variable in development, and often even absent. A somewhat medium form was shown in Fig 1. An extreme development is seen in the genus *Balaninus*, figured later on, while in *Dendroctonus* and other Scolytidæ it is extremely short or wanting.

A further modification of the beak by which it becomes bent beneath the head and more or less received, in repose, within a groove in the breast, is found in the tribes Cryptorhynchini, Ceutorhynchini and Zygopini, and in the subfamily Thecesterninæ. This form of the beak is shown in the figure of *Craponius inæqualis* Say, under the tribe Ceutorhynchini. The beak is often slightly enlarged at apex and in the genus *Cossonus* (Fig. 5), it is very much widened or dilated. At the sides of the beak there are frequently seen more or less definite grooves or scrobes for the reception of the antennæ; the position on the beak varies, and the direction may be directly towards the eye or more or less below it, as shown in Fig. 6.

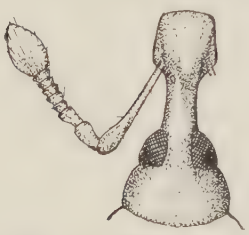

Fig. 5. Head of *Cossonus*, showing the beak widened at apex. (Original.)

The deciduous cusps of the mandibles, which characterize the subfamily Otiorhynchinæ, are seldom to be seen, on account of their being lost soon after the adult emerges from the pupa, but the scar marking the point of attachment is permanent. Figure 7 shows the tip of the beak of a specimen in the junior author's collection in which the cusp itself has been preserved on one mandible, while the scar shows on the other.

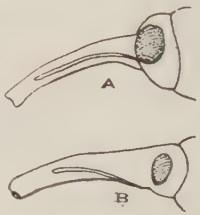

Fig. 6. A, antennal groove lateral and directed towards the eye; B, antennal groove directed beneath the eye. (After Bedel.)

The mandibles are always small and situated often within the end of the beak, but there are two variations readily observed and useful in classification. In *Rhynchites* they are toothed on the outer side, so that the teeth show plainly as two little triangular projections even when, as is usually the case, the mandibles are folded. They become conspicuous, as shown in Fig. 8, when the mandibles are open.

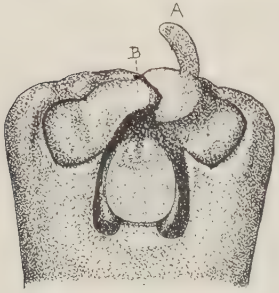

Fig. 7. Tip of beak of *Otiorhynchus sulcatus*; A cusp in place; B, mandibular scar. (Original.)

The motion of the mandibles is usually horizontal, the teeth consequently being visible from above, as shown in Figs. 8, 10 and 11, but in *Balaninus* the reverse is the case and the motion is vertical, so that the teeth of the mandibles show from the side view only. (Fig. 9.)

The structure of the maxillæ has been much discussed in Scolytid literature, and the relation between the radiating spines found on the maxillæ of bark-boring Scolytids and the pilose lobes charateristic of the wood-boring Ambrosia beetles is of much interest. These parts are however so small and difficult to observe that we have avoided using them in our keys and refer the reader to the works of Hopkins, Swaine and Nusslin for figures and further detail.

Fig. 8. Mandibles of Rhynchites. (After Bedel.)

The flexible palpi of Anthribidæ and Rhinomacerinæ have already been mentioned. Our observation does not entirely confirm the view conveyed by some previous authors that these are entirely flexible, and we give therefore in Figs. 10 and 11 drawings of the beak of *Rhinomacer* showing this type of palpus, certainly less rigid than in other Rhynchophora, but still preserving the general character of the palpi observed throughout the suborder. An illustration of the head of *Euparius lugubris*, showing the flexible palpi of the Anthribidæ also appears in the text treating of that family.

Fig. 9. Tip of beak of *Balaninus proboscideus* showing vertical mandibles. A, top view; B, side view. (Original.)

The mentum is used sparingly in the classification, being also difficult to observe; but its differences and that of the buccal

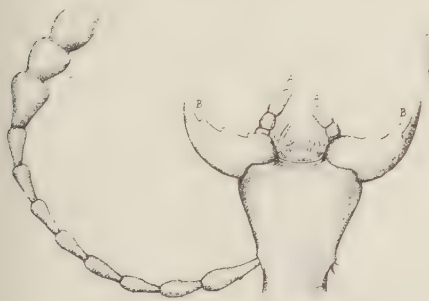

Fig. 10. Tip of beak of *Rhinomacer* from above. A, flexible palpi; B, horizontal mandibles; C, antenna with loose, three-jointed club.

Fig. 11. Tip of beak of *Rhinomacer* from beneath. A, flexible palpi. (Original.)

cavity are of moment. The usual form has been shown in the figure of the mouth parts of *Pissodes*, where it is moderate in size, not concealing the maxillæ, and inserted upon a more or less elongate gular peduncle. In Otiorhynchinæ it is larger, filling the buccal space and concealing the maxillæ. Intermediate forms occur in some genera like *Sitona*, *Alophus* and

Ithycerus, which have been variously placed in consequence by different authors. In the Brenthidæ, apart from the sexual disparity in the mandibles, sufficient alone to indicate their anomalous character, the lack of a gular peduncle, with the mentum consequently nearly filling the buccal cavity, indicates a type of separate origin. In Calandrinæ also we observe remarkable departures from the usual form, the gular peduncle being extremely long and narrow, while in Cossoninæ it is present as a broad short plate.

The difficulty attending the observation of these mouth parts is fortunately in great part obviated in classification by the fact that modifications of the more readily observed antennæ serve as equivalent indices of relative rank. The most simple form of antenna is found in the Brenthidæ, which therefore, in conjunction with what has already been recorded of their mouth parts, leads us to place them first or lowest in the series. Their antennæ are straight, without a definite club at apex and the last three joints are not greatly different in length. (Fig. 12, A.)

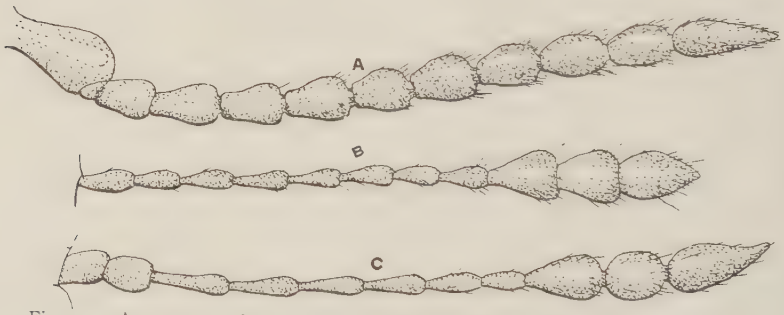

Fig. 12. A, antenna of a Brenthid, *Eupsalis minuta* Drury; B, antenna of *Rhinomacer;* C, antenna of an Anthribid, *Euparius marmoreus* Oliv. (Original.)

The next step is found in Rhinomacerinæ and Anthribidæ (Fig. 12, B. and C.), already noted for their comparatively flexible palpi. The antennæ are straight in these groups and the last three joints preserve their relatively equal length, but are enlarged to form a loose club. The entire antenna is also more pubescent and presumably sensitive.

The next step in antennal development is the shortening of the last three joints with more or less modification of their shape, so that a compact oval or globose club results. The three joints are, however, plainly separated by sutures and are pubescent and nearly equal in length, the terminal one being sometimes elongate. Such clubs are found in the subfamilies Apioninæ, Allocorhyninæ

and Tachygoninæ which we place next in the series with straight antennæ, and each of these has other important supporting characters. For example we find in Apioninæ the elongated trochanter intervening between the coxa and the femur; in *Allocorhynus* the extraordinary hind femora, swollen and crenulate on the margin as shown in Fig 40 on a later page, and in *Tachygonus* (Fig. 15) the remarkable form and length of the hind leg. In *Thecesternus*, the antenna (Fig. 13-c) usually described as feebly elbowed, is also of a primitive type. Here the peculiar form of the prosternum affords a similar supporting character. However, the facies and the form of beak strongly resembles those of Cryptorhynchini, and the genus is therefore placed close to that tribe among the forms with elbowed antennæ. We have thus, as the lowest in rank of the Rhynchophora, forms possessing the straight antennæ, common in Coleoptera genuina, and separated, as between themselves, by peculiarities of structure not observed in the great bulk of the Rhynchophora.

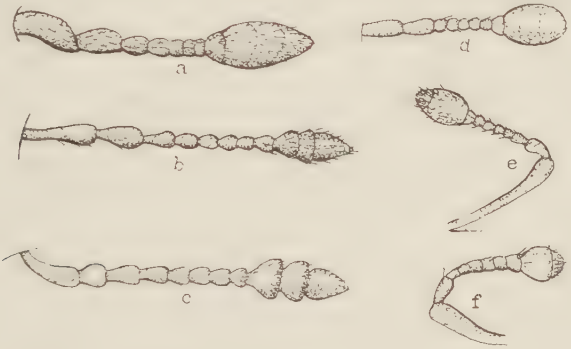

Fig. 13 Different forms of antennæ; *a*, of *Apion; b*, of *Allocorhynus; c*, of *Thecesternus; d*, of *Tachygonus; e*, of *Anchonus; f*, of *Acamptus.* (Original.)

Fig. 14. Leg of *Apion; a*, coxa; *b*, trochanter; *c*, femur. (After Bedel.)

In that great bulk we find a development in the antennæ in a different direction. The first joint becomes more or less elongate and is called the scape, and beyond it the antenna is suddenly bent, elbowed or "geniculate" as it is called in most of the books. Concurrently we find the development of antennal grooves to receive the antennæ, already noticed (Fig. 6), and often a dilation of the tarsi to be noticed later. The club is usually compact, formed of three approximately equal joints, plainly separated by sutures; the whole antenna

Fig. 15. Hind leg of *Tachygonus.* (Original.)

is usually pubescent and highly sensitive; the funicle, or portion between the scape and the club, is usually composed of seven, rarely fewer, joints. Many differences in the length of the scape, the length of the entire antenna, relative length of the joints, etc., will be found, but the general type here described is characteristic of the great bulk of Rhynchophora embraced in the Otiorhynchinæ and Curculioninæ proper.

The next and final step in antennal development is manifested in various directions, either as unusual forms of scape, or by reduction in number of funicular joints, by loss of pubescence on parts of the antenna, or by enlargement or unusual forms of the club. Important among these final developments is the enlargement of the first joint of the club by which it becomes the greater part of the club instead of being approximately equal to the other two as we have found it in the groups heretofore considered. By this character we believe the Calandridæ of LeConte (here, in deference to opinions expressed by other authors, treated as two subfamilies rather than a family) can be definitely separated, with the Cossoninæ, including the Anchonini, which have been removed by European authors, and the Acamptini, which have occupied a debatable position. Their antennæ may show a reduced number of funicular joints or not, the club may be free of pubescence at base or not, their characters may show variation in other respects, but always we believe the first joint of the club shows the enlargement at the expense of the succeeding joints. Some of the varied forms are shown in Fig. 13 *e.* and *f.* and in Fig. 16.

Fig. 16. Antenna of *Sphenophorus* showing 6-jointed funicle and enlarged basal joint of club. (Original.)

In the Scolytidæ the developments begun in Calandrinæ are continued and the variations multiplied. In one group the scape becomes sexually clothed with long hair, in another the funicle is reduced to a single joint; the sutures of the club are often obsolete, and its surface becomes in part corneous, while the form of the club often varies, at times assuming grotesque proportions. It is sufficient here to point out something of the extent to which it varies; details will be given in our treatment of the family.

Fig. 17. Antennæ of Scolytidæ. (After Kuhnt.)

Coupled with these extreme antennal developments we find externally toothed or mucronate tibiæ, and despite the practical absence of a beak, we have no hesitation in placing the Scolytidæ as the highest of the Rhynchophora.

Leaving the antennæ, we shall now mention a few structures that prove useful in classification though subordinate to those already described. The legs afford many such. The coxæ may be separated or contiguous. The trochanters are usually short and inconspicuous, but are long in Apioninæ, as already shown in Fig. 14. The femora are often toothed and in *Orchestes* are remarkably enlarged,

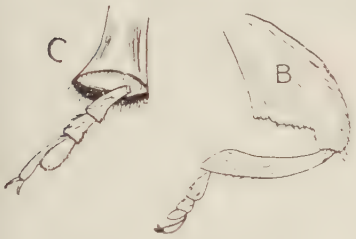

Fig. 18. B, Femur of *Orchestes;* C, tibia of *Bar is tus* showing the closed corbel, surrounded by a row of hairs. (After Kuhnt.)

The tibiæ are equally subject to variations and are, throughout the Scolytidæ, with few exceptions, externally serrate or toothed. The apex of the tibiæ is the seat of many characters of service. The truncate oval tip common in Otiorhynchinæ, Hylobiini, etc., is sometimes called the corbel, especially when the insertion of the tarsus is on the inner side a little above the tip. This is said to be "open" when its edge is interrupted on the inner side by the articular cavity of the tarsus, and "closed" when the cavity does not reach it and the oval margin is entire. (Fig. 18, C.) In other species the tibiæ may end either in a stout blunt hook or spur, or in a spine. In the latter case they are said to be mucronate. (Fig. 37, *p*—*s*.)

Fig. 19. Tibia of Scolytidæ.

The tarsi also present many modifications. In the arboreal Curculionidæ the third joint is commonly dilated (Fig. 20), bilobed and spongy pubescent beneath, but in the palustral and epigeal species this form is seldom seen, the tarsi being equally narrow. In the relative proportions of the joints there is also much variation, and the subfamily Platypodinæ is distinguished by the great elongation of the first tarsal joint. The claws of the tarsi, though naturally small, also furnish useful characters. They are usually two in number and may be simple, connate, toothed, appendiculate or cleft.*

Fig. 20. Showing bilobed third tarsal joints. (After Kuhnt.)

*For a definition of these terms see Coleoptera of Indiana, p. 18; also Fig. 37, *h*—*l*.

Fig. 21. Tarsus of *Platypus.*

The eyes may be either contiguous, approximate, or distant on the upper part of the head, terms which explain themselves, and in the rare *Hormops abducens* they are nearly joined *below* the head. They are often partly or wholly concealed by a projecting postocular lobe of the front margin of thorax and this lobe may be fringed with short stiff hairs to which the name vibrissæ has been applied.

The side pieces of the meso- and metasterna vary much in size and shape, and these variations are used as primary characters in separating the divisions of Otiorhynchinæ (Fig. 13) and the isolating of the Barini. The middle process of the first ventral extending forward between the hind coxæ may be acute, as in Attelabinæ, or obtuse as in most Curculionidæ (Fig. 22, A, B.) The ventral segments may be equal in length or there may be great disparity between them in this respect. The sutures separating them may be straight across or greatly curved, and in Tychiini and some Ceutorhynchini the hind margin of one segment is often so curved that the extremities project over and conceal the sides of the succeeding segments. (Fig. 22, *d.*)

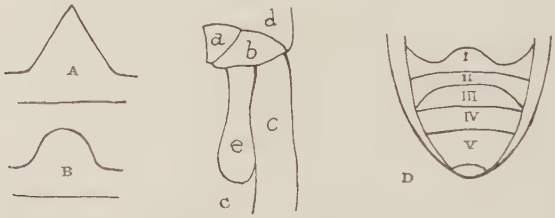

Fig. 22. A, Middle process of first ventral acute; B, same, obtuse; C, part of under surface of a Barinid, *a*, mesosternal episternum; *b*, mesosternal epimeron extending between the thorax, *d*, and the elytra, *c*, and truncating the latter at the humerus; *e*, metasternal episternum; D, ventral surface of a Tychiinid, showing the curved suture between the second and third segments, the ends of the second projecting backward almost to fourth. (After Bedel.)

Combining the characters above described, and selecting those we believe will be most easily apprehended by the reader, we have the following key to the families of Rhynchophora occurring in our region:

KEY TO THE FAMILIES OF RHYNCHOPHORA.*

a. Beak rarely absent, usually longer than broad; tibiæ never with a series of teeth externally.

b. Antennæ straight without a distinct club, though with the outer joints often more or less thickened; beak present at least in female and pointing directly forward (Fig. 24); form usually very slender and elongate. Family I. BRENTHIDÆ, p. 18.

bb. Antennæ straight or elbowed, always with a distinct club.

c. Palpi flexible; antennal club rarely compact; beak always short and broad; labrum present; thorax with a transverse raised line which is either ante-basal or basal. (Fig. 27.) Family II. ANTHRIBIDÆ, p. 23.

cc. Palpi rigid and labrum wanting except in subfamily Rhinomacerinæ; antennal club usually compact; beak variable in length, often long and curved downwards. Family III. CURCULIONIDÆ, p. 46.

aa. Beak absent or extremely short and broad; tibiæ with a series of teeth externally, or if these are wanting, with a prominent curved spine at apex; antennæ short, but little longer than head, always elbowed and with a compact club except in *Phlœophthorus*, where the club is lamellate; palpi rigid; body short, subcylindrical or rarely oval. Family IV. SCOLYTIDÆ, p. 576.

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*In using this key the student must remember that while the beak in many Curculionidæ is so long, slender and curved downwards as to permit of immediately placing them in their family position, there are other species, especially in the Otiorhynchinæ, whose broader beaks would suggest their belonging to the Scolytidæ or Anthribidæ. In such cases, if the antennæ are elbowed, he must find the serrate tibiæ that characterize the Scolytidæ, or if straight, the flexible palpi that characterize the Anthribidæ; otherwise the specimen does not belong to those families.

Family I. BRENTHIDÆ.

The Primitive Weevils.

A family of about 700 species, confined chiefly to the tropical regions and comprising very elongate, slender beetles having the mouth organs differing widely according to genus and sex, the antennæ 10- or 11-jointed, not elbowed and without distinct club (Fig. 12, A.), the basal joint stouter and a little longer than second. Beak straight, directly continuing the long axis of the body, often so thick at base as to form an elongate head; eyes small, rounded, not granulated; labrum wanting. Thorax very elongate, truncate before, pedunculate behind, without postocular lobes. Elytra elongate, covering the pygidium, with a fold close to the margin on the inner surface; inner wings well developed. Prosternum long in front of the coxæ, its suture obsolete; mesosternum rather long, its side pieces diagonally divided; metasternum very long, its episterna narrow. Abdomen with five ventral segments, the first and second very long, third and fourth short, fifth longer, flat, rounded behind. Legs rather stout, femora clavate; tarsi spongy pubescent beneath, the third joint bilobed.

The beak of the female is slender, in our species, usually long, cylindrical (Fig. 24) and provided with pincer-shaped mandibles, thus enabling her to bore deep holes in the wood beneath the bark of dead trees, often inserting the beak up to the eyes and afterwards depositing an egg in each hole. The males, contrary to the general rule, are usually larger than the females, and have the mandibles stout, curved and pointed and the beak in our most common species broad, flat and widened toward the end. (Fig. 23.) The strong mandibles of the male are used in fighting, and A. R. Wallace, in his "Malay Archipelago" gives an interesting account of two male Brenthians that he saw fighting for a female, who stood close by busy at her boring. "They pushed at each other with their beaks and clawed and thumped, apparently in the greatest rage, although their coats of mail must have saved both from

Fig. 23. *Eupsalis minuta* Drury. Male. × 4. (After Felt.)

injury. The small one, however, soon ran away, acknowledging himself vanquished. In most Coleoptera the female is larger than the male and it is interesting, therefore, as bearing on the question of sexual selection, that in this case, as in the stag beetles where the males fight together, they should be not only better armed but also much larger than the females." Riley has also recorded (1874, 115) that it takes about a day for the female of *Eupsalis minuta* to make a puncture and deposit an egg, the male meanwhile standing guard and occasionally assisting his mate in extracting her beak. Should a strange male happen by a furious contest at once ensues, and continues sometimes for hours, until one or the other is thrown from the tree. The successful party then takes his station as guard and, if it be the stranger, takes the same care of the female as did the vanquished rival.

The family Brenthidæ is represented in North America, as far as known, by only seven species distributed among six genera. These have been treated by LeConte & Horn in their Rhynchophora of North America, and in part by

Horn, Geo. H.—"The Brenthidæ of the United States," *in* Trans. Am. Ent. Soc., IV, 1872, 127—129.

Schaffer, Chas. — "Table of Genera and Species of N. Amer. Brenthidæ," *in* Journ. N. Y. Ent. Soc., XXIII, 1915, 52—55.

KEY TO EASTERN GENERA OF NORTH AMERICAN BRENTHIDÆ.

a. Antennæ 11-jointed, the last joint oval, pointed, not much longer than the others.

b. Head short, transverse or quadrate, hardly prolonged and not convergent behind the eyes; beak of female equal in length to that of male or longer.

c. Antennal joints 2—11 equal in width, or the outer slightly narrower; beak very dissimilar in the two sexes, shorter and broader in male, narrow and cylindrical in female; thorax without median groove. I. EUPSALIS.

cc. Antennal joints 2—8 equal in width or nearly so, the last three broader, forming a feeble club; beak nearly alike in the sexes; thorax with a strong median lengthwise groove. II. TRACHELIZUS.

bb. Head longer than broad, oval, prolonged and convergent behind the eyes; beak of female shorter than that of male; thorax deeply grooved near base. III. BRENTHUS.

aa. Antennæ 10-jointed, the last joint very elongate; form somewhat antlike; antennæ inserted near middle of beak. IV. CYLAS.

I. EUPSALIS Lac., 1866. (Gr., "well" + "a pair of shears.")

Elongate, brown, shining species having the head broad, its hind angles obsolete; mouth parts concealed by the mentum; mandibles of male curved, flattened, pointed, toothed on inner edge; of female small, pincer-shaped; middle coxæ rounded, separate; femora slender, cylindrical at base, front tibiæ sinuate and obliquely grooved on inner side, armed with a hook on outer and a spur on inner side of tip; tarsal claws large, simple, divergent.

1 (8967). EUPSALIS MINUTA DRURY, 1770, 95.

Elongate, slender, subcylindrical. Dark reddish-brown to piceous, elytra with narrow elongate yellowish spots, often united to form two or three nearly complete cross-bars. Thorax longer than broad, widest behind the middle, base constricted, sides curved to middle, then strongly converging to apex; disc highly polished, minutely and very sparsely punctate. Elytra not wider than thorax, more than twice as long as wide; striæ deep, those on sides coarsely punctate; intervals smooth, convex. Abdomen of male with first two ventral segments deeply grooved at middle, of female feebly impressed. Length, male, 7.2—17mm.; female, 6.5—14 mm. (Fig. 23, male; Fig. 24, female.)

Frequent throughout Indiana, more so in the southern counties; April 9—July 26. Occurs beneath bark of recently felled or dying oak, poplar and beech trees. Throughout New Jersey on chestnut, oak and maple. Ranges from New England and Canada to Nebraska, south to Florida and Texas. The eggs are deposited in May and June and the larvæ bore in all directions through the heart wood, often causing serious injury to white-oak stave bolts.

Fig. 24. × 4. (After Felt.)

The insect varies much in size and three forms have been recognized, based mainly on the shape of beak of male, which is very variable. These are

minuta Drury, described above and having that portion of the beak of male in front of the antennæ wider than long, the mandibles as long as that part of the beak and strongly cusped.

lecontei Power (1878), thorax more strongly punctate, beak of males elongate and narrow, the mandibles shorter with weaker cusps.

sallei Power (1878), outer five joints of antennæ cylindrical instead of ovate, beak of males as in *lecontei*, thorax punctate as in *minuta*.

The first is more northern, the second more southern in distribution, but all three are among the Indiana material at hand. No difference is recognizable in the females, and they may be considered as only individual variations of the same species.

A male in the senior author's collection from Marion county, Indiana, measuring only 5 mm. in length, with the thorax almost impunctate, widest at middle instead of behind the middle, the beak shorter than the thorax, and the color uniform pale reddish-brown, with a small fuscous spot behind the middle of elytra, presents a stronger departure from the usual form than either of Power's varieties, and may be known as variety *paupercula*.

Of the combats of the males of this northern Brenthian LeConte (1883, 709) has said: "They result in no injury to either of the parties engaged, the dense chitinous covering affording a perfect protection. The weaker male, overcome by exhaustion, eventually flees and leaves to his more vigorous victor the honorable task of guarding and assisting the fair object of strife in her efforts to preserve the species." And again (1876, 326) he says: "The measurements show a slight average superiority of size in the male, but not sufficient to warrant any generalization in favor of sexual selection, produced by the bloodless combat of these insects, which seem to be actuated rather by chivalric sentiment than by animal passion." Smith says that when the beaks of the females become wedged, as they sometimes do, the males use their forceps-like jaws to pull them out, but Riley (1874, 115) states that the male helps in removing the beak by "stationing himself at a right angle with her body and pressing his heavy prosternum against the tip of her abdomen, her stout fore legs thus serving as a fulcrum and her long body as a lever."

II. Trachelizus Schön., 1840. (Gr., "straight" + "neck.")

This genus, characterized in the key, is represented in this country by the single species

2 (——). Trachelizus uncimanus Boh., Schön., 1839, 496.

Brown, more or less shining. Beak nearly alike in the two sexes, the basal part as long as apical and of equal width, male, shorter and broader than the apical part, female. Thorax nearly impunctate with a strong longitudinal median impression. Elytra nearly parallel with strongly impressed sutural striæ which are impunctate, the other striæ represented by rows of feebly impressed punctures, except the three near side margin, which are deeply impressed. Suture between first and second ventrals obliterated at middle, visible at sides. Femora and tibiæ unarmed. Length 16 mm.

Key Largo and Elliott's Key, Fla. Occurs also in Cuba with other species of the genus.

III. Brenthus Fab., 1787. (Gr., name of a bird.)

This genus, also sufficiently characterized in the key, is one of the most characteristic neotropical genera, containing about 25 species and represented in this country by two species in Lower California and by the following:

3 (8970). Brenthus anchorago Linn., 1766, p. 1739.

Elongate, slender. Black or dark chestnut-brown, shining; elytra each with two narrow, reddish-yellow stripes, the inner abruptly abbreviated behind, the outer in front. Thorax of male longer and broadly constricted at middle, of female shorter, conical, deeply grooved near base in both sexes. Striæ on sides of elytra more shallow and more distinctly punctate than those near suture; tips of elytra elongate-attenuate in male, obtuse in female; second elytral interval flat in its entire length. Front femora only dentate. Length 10—52 mm.

A Tropical American species which has been taken in southern Florida at Biscayne Bay, Miami and on the Florida Keys. Occurs on flowers and under bark of various trees. (*Slosson.*)

IV. Cylas Latr., 1806. (Gr., "a tumbler.")

Elongate, ant-like beetles having the maxillæ exposed, the mentum oblong and raised on a short peduncle; mandibles pincer-shaped; head not constricted behind; front coxæ conical, prominent, contiguous; tibiæ slender, straight, not mucronate at tip; tarsal claws small, connate at base. One species occurs in the Southern States.

4 (8966). Cylas formicarius Fab., 1798, 174.

Very elongate, smooth, shining. Pale reddish-brown, elytra bluish-black, head and beak dusky. Beak twice as long as head, stout, cylindrical, nearly straight, finely punctured near the base. Thorax nearly twice as long as wide, deeply constricted or subdivided at basal third, disc smooth, shining. Elytra elongate-oval, strongly convex, slightly wider than thorax, humeri very oblique; striæ fine, feebly punctate; intervals flat, smooth. Last joint of antennæ cylindrical, longer than the others united, male, oval and shorter, female. Length 5—6 mm. (Fig. 25.)

Fig. 25. × 5. (After Duggar.)

LaGrange, Fla., Sept. 11. Recorded from Florida, Louisiana and Texas. An introduced Asiatic species, which occurs also in the West Indies and Madagascar. Comstock (1879, 249) states that the larva is

known as the "sweet-potato root-borer," and about 1880 did much damage to that crop near Manatee, Fla., the young larvæ boring little tunnels through the root in all directions so that the vines died. The larva pupates at the end of its burrow and undergoes its entire transformation from egg to adult in 31 days. Beattie (1916, 26) mentions the beetle as "widely distributed and causing considerable injury in the Gulf States." Hamilton (1895, 321) records the taking of three specimens on the ocean beach at Lake Worth, Fla., from a rough prostrate Compositæ plant growing in mats on the sand, there being no sweet potato or other Convolvulaceous plants within half a mile. Breeds also in the seaside morning glory, *Ipomœa pes-caprea* L., boring the stem. (*Slosson.*)

Family II. ANTHRIBIDÆ.

The Fungus Weevils.

A small family of brown or fuscous, often variegated, species, having the beak broad, flat, sometimes so short as to be indistinct, never separated from the front by a transverse impression; antennæ inserted usually under the sides of the front, slender, straight, pubescent, joints 9—11 broader, more or less compressed, rarely forming a compact oval club. Labrum distinct, quadrate, fringed with hairs; labial palpi 3-jointed, slender, cylindrical, longer than in other Rhynchophora, the last joint elongated, narrower at tip; maxillary palpi slender, 4-jointed, with the last joint also longer and narrower at tip. (Fig. 26.) Thorax variable in form, usually truncate in front, rarely rounded over the head (*Brachytarsus* and *Choragus*), base truncate, with a transverse elevated line which is either antebasal (*Tropiderini*) or entirely basal. Elytra conjointly rounded behind, with ten striæ (except in *Xenorchestes*). Front coxæ globose, narrowly separated, hind ones transverse; abdomen with five free and nearly equal segments; pygidium visible, undivided in both sexes. Legs slender; tibiæ truncate at tip without spurs or hooks; tarsi brush-like beneath, 4-jointed, second joint triangular, emarginate, third joint small, bilobed, often partly concealed by the second, fourth joint slender with divergent claws, either simple or toothed.

Fig. 26. Head of *Euparius lugubris* Oliv., showing at A the flexible palpi of Anthribidæ. (Original.)

The presence of the elevated line or ridge near or at the base of thorax is a constant character (Fig. 27), and its modifications form one of the surest guides to the position of the genera. The antennæ of the male are sometimes much longer than the body. The larvæ as a rule infest woody fungi, dead twigs, seeds and the stems of plants and have legs or pseudopods in some genera. However, the habits and metamorphoses are but little known. The typical genus is *Anthribus*, founded by Geoffroy in 1764, meaning "a flower" and "to destroy." The family includes 800 or more species, mostly tropical and Australian in distribution. Some of them resemble the members of the subfamily *Lamiinæ* of the Cerambycidæ on account of the great development of the antennæ. The North American species have not recently been monographed. Abroad they have been catalogued by Bovie and studied by Dr. Karl Jordan, who treated the family in the Biologia. They are treated by

Fig. 27. Head and thorax of an Anthribid, showing antebasal line at a. (After Bedel.)

LeConte, J. L.—"Rhynchophora of N. Amer.—Anthribidæ," *in* Proc. Amer. Phil. Soc., XV, 1876, 391—409.

Schæffer, Chas.—"New Anthribidæ," *in* Trans. Amer. Ent. Soc., XXXII, 1906, 267—278.

Only about 60 species of Anthribidæ, distributed among 23 genera, are known from North America. Of these 37 species, representing 19 genera, occur in our territory, several of these being immigrants from the tropics. Following LeConte and Horn, the genera are grouped in four tribes as follows:

KEY TO TRIBES OF NORTH AMERICAN ANTHRIBIDÆ.

a. Antennæ inserted on the sides of the beak.

b. Transverse ridge of thorax situated in front of the base (Fig. 27) (very near it in *Eusphyrus*). Tribe I. TROPIDERINI, p. 25.

bb. Transverse ridge situated at the base, the surface behind it perpendicular. Tribe II. ANTHRIBINI, p. 32.

aa. Antennæ inserted on the front of head or base of beak; thoracic ridge basal.

c. Elytra striate. Tribe III. ARÆOCERINI, p. 41.

cc. Elytra not striate. Tribe IV. XENORCHESTINI, p. 44.

Tribe I. TROPIDERINI.

In this tribe the thoracic ridge is (except in *Eusphyrus*) remote from the base, more or less sinuous and obliquely bent on the sides; antennæ inserted in foveæ under the lateral edge of the beak, the edge sometimes expanded to partially cover the cavities. (Fig. 28).

Fig. 28. *Platyrhinus latirostris* L. A British species of Tropiderini; *J*, tarsus of same. (After Wood.)

KEY TO EASTERN GENERA OF TROPIDERINI.

a. Sides of beak not dilated over the antennal cavities.

b. Eyes entire; antennæ longer than body in male, two-thirds as long, female; length 6 or more mm. I. ISCHNOCERUS.

bb. Eyes emarginate; antennæ less than half the length of body; length less than 3 mm.

c. Hind angles of thorax not directed outwards.

d. Antennal club oval, solid, sensitive only at tip; eyes feebly broadly emarginate. II. ORMISCUS.

dd. Antennal club 3-jointed; eyes more distinctly arcuate-emarginate. III. TOXOTROPIS.

cc. Hind angles of thorax directed outwards; transverse ridge of thorax very near the base. IV. EUSPHYRUS.

aa. Sides of beak dilated over the antennal cavities.

e. Antennal club narrow, not compressed; length 5 or more mm.

f. Thoracic ridge strongly angulated, the apex of the angle touching base at middle; claws simple. V. GONOTROPIS.

ff. Thoracic ridge straight at middle; base of thorax strongly bi-emarginate; claws acutely toothed at middle. VI. EURYMYCTER.

ee. Antennal club oval, compressed; length less than 5 mm.

g. Beak shorter than head; eyes oblique, slightly oval. VII. TROPIDERES.

gg. Beak longer than head; eyes rounded; antennæ of male as long as body. VIII. ALLANDRUS.

I. ISCHNOCERUS Schön., 1839. (Gr., "slender" + "horn.")

Here belongs a rather large species having the beak slightly longer than head, carinate above, dilated at tip; antennal cavities large, bordered above by a small elevated line; eyes longitudinal, elliptical, rather coarsely granulated; antennæ very slender, second joint twice as long as first, three-fifths as long as third; 9—11 broader, flattened, forming a loose, oval club; second tarsal joint emarginate with prolonged angles; claws with a long, acute median tooth.

5 (9202). ISCHNOCERUS INFUSCATUS Fahr., Schön., 1839, 192.

Oblong, subcylindrical. Brown or blackish with yellowish-brown and pale gray pubescence intermixed, exhibiting no distinct pattern; tibiæ red-

dish, annulate with black. Thorax nearly twice as long as wide at base, convex, narrowed in front; disc rugosely punctate and with three feeble longitudinal carinæ, the grooves between them wide and rather deep; base truncate, the transverse ridge about one-fifth in front of base, more or less sinuous, forming an obtuse angle at middle and bent obliquely forward on the sides. Elytra at base subtruncate nearly one-half wider than thorax, striæ punctate. Length 6.8—10 mm.

-- Enterprise, Key Largo, Key West and Biscayne Bay, Fla., on dead branches. Southern States as far north as District of Columbia. Texas and Mexico.

II. Ormiscus Waterhouse, 1845. (Gr., "neck.")

Small, subcylindrical species having the beak broad, flat, not longer than head; antennæ alike in both sexes, scarcely reaching the base of the thorax; eyes rather large, oblique: thorax strongly narrowed behind the transverse carina, which is prominent, parallel with the base, and ends each side in a small cusp. One species occurs with us.

We have followed the "Classification" in our treatment of this and the next two genera, though Dr. Karl Jordan and Charles Schæffer have recently expressed more or less definitely views in favor of uniting *Toxotropis*, *Gonops* and *Eusphyrus* with *Ormiscus*, on account of the failure of the characters used by LeConte in some of the numerous tropical species of the group. The spur-like process at apex of middle and hind tibiæ of male *Gonops* is said to be present also in some tropical *Toxotropis*, while in others only the middle tibiæ are so armed. The position of the antebasal carina of *Eusphyrus* is peculiar, in its absolute described relation to the base, to our eastern species only and variable in others. The deeply cleft claws of some *Toxotropis* gradually become more simply toothed in other species; so that those who have worked with the species of the world are puzzled to know what characters can be relied upon to separate these closely allied genera. In our limited fauna, however, the distinguishing characters as set forth by LeConte are sufficient, and are therefore followed in the absence of any better complete classification of the group.

6 (9208). Ormiscus saltator Lec., 1876, 397.

Oblong, subcylindrical. Brownish-black, mottled with spots and bands of ash-gray pubescence, the most prominent of which is a band before the middle of elytra with a spur forward along the suture to scutellum and another each side to humerus, these often abraded. Thorax subquadrate, one-

half wider than long, densely and finely punctured. Elytra scarcely wider and twice as long as thorax, sides parallel to apical fifth then broadly rounded; disc with rows of large, deep punctures. Length 1.2—1.6 mm.

Marshall, Vermillion and Posey counties, Indiana; June 2—25. Staten Island, N. Y., on hickory in June. Throughout New Jersey, June and July, breeding in the dead wood of deciduous trees. Ranges from New England and Canada to Michigan and Illinois, south to Florida.

III. Toxotropis Lec., 1876. (Gr., "curve" + "keel.")

In this genus, which is consolidated with *Ormiscus* by some authors, the antebasal ridge becomes less remote from the base, leading up to *Eusphyrus* where it is almost basal. The antennal club is elongate-oval, compressed, composed of three distinct subequal joints; thoracic ridge antebasal, regularly curved but directed transversely toward the sides; eyes more distinctly emarginate than in *Ormiscus;* antennal cavities small, rounded. Four species have been described from the Atlantic region, all very rare in collections, and we are able to add a fifth from Florida.

KEY TO EASTERN SPECIES OF TOXOTROPIS.

a. Claws with a small acute median tooth.
b. Brown or blackish, varied with patches of white pubescence; length 1.2 mm. 7. PUSILLUS.
bb. Black, densely clothed with ash-gray pubescence; length 1.5 mm. 8. FASCIATUS.

aa. Claws cleft or deeply bifid.
c. Third elytral interval with three tubercles. 9. SEXTUBERCULATUS.
cc. Third interval without tubercles.
d. Blackish-brown; elytra with a metallic tinge, the paler pubescence without a definite pattern; length 2.2 mm. 10. SUBMETALLICUS.
dd. Reddish-brown, clothed with paler scales forming a definite pattern on elytra; length 2.5 mm. 11. FLORIDANUS.

7 (9209). Toxotropis pusillus Lec., 1876, 398.

Same size, form and color as *Ormiscus saltator*, but with the antebasal ridge near the base at middle, regularly curved not angulate. Eyes larger and more prominent. Thorax more finely punctured. Elytral striæ with rows of rather large punctures; intervals flat, even. Length 1.2 mm.

Anglesea, N. J.; Tampa, Fla., June 10 (type); Ohio on osage orange; District of Columbia on old twigs; Texas and Mexico. LeConte (1884, 32) states that "specimens collected in Texas

vary much in markings; one is black with an inverted T-formed white mark near base of elytra; others are as pubescent as *Brachytarsus variegatus* Say, and not unlike it in appearance."

8 (9210). TOXOTROPIS FASCIATUS Lec., 1884, 32.

Of the same size and form as *T. pusillus*. Reddish-brown, densely clothed with cinereous pubescence. Elytra with a broad dark brown transverse band; antennæ, tibiæ and tarsi testaceous. Length 1.5 mm. (*LeConte.*)

Marion, Mass.; District of Columbia. The type was from Columbus, Texas.

9 (——). TOXOTROPIS SEXTUBERCULATUS Schæff., 1906, 269.

Brown; pubescence on head, thorax and elytra intermixed with cinereous, not forming a distinct design; scutellum white. Antennæ reaching hind angles of thorax, basal joints pale, the others piceous. Antebasal ridge of thorax broadly rounded. Third elytral interval with three tubercles, of which the sub-basal is the largest. Claws deeply cleft, the inner portion of the cleft claws touching each other. Length 2.5 mm.

Enterprise, Florida. This species represents *Gonops* Lec. which Schæffer does not recognize as valid.

10 (——). TOXOTROPIS SUBMETALLICUS Schæff., 1904, 234.

"Blackish-brown, elytra with a slight metallic tinge; clothed with brown, fulvous and white pubescence, the white forming an indistinct curved band near base and an irregular one at apex. Head densely punctured, clothed with brown, fulvous and white hairs. Eyes rounded, not deeply emarginate; antennæ short, black, nearly reaching the basal carina. Thorax in its broadest part broader than long, sides slightly curved, narrowing to apex, ante-basal ridge, curved, forming a broad lobe at middle; disc densely punctured and densely clothed with white, fulvous and brownish hairs. Elytra not broader than thorax in its broadest part; disc with rows of moderately coarse punctures; intervals flat, densely punctured. Beneath black, densely punctured, pubescence white, not very dense. Femora, apex of tibiæ and tarsi black; claws deeply cleft, the inner portion convergent. Length 2.2 mm." (*Schæffer.*)

Described from Brownsville, Texas. Recorded by Dury as occurring at Cincinnati, Ohio.

11 (——). TOXOTROPIS FLORIDANUS sp. nov.

Elongate, ovate, broader behind. Reddish-brown clothed with paler scales which form a definite pattern on the elytra, abdomen darker, legs and antennæ paler. Head convex, irregularly clothed with pale elongate scales, antennæ reaching about base of thorax, last three joints about equal in length, and forming an elongate club. Thorax confluently punctate, irregularly clothed with elongate pale scales, ante-basal ridge arcuate at middle, where it approaches but does not reach the base, straight and

transverse at sides, ending in a very short curve which hardly ascends the sides. Elytra at base as broad as thorax, very slightly broader behind, finely striate, striæ punctate, surface densely clothed with pale scales, except on each side of the white pubescent scutellum and a broadly arcuate area behind the middle extending from the margin to the third striæ; claws deeply cleft, the inner portions of the cleft claws touching. Length 2.5 mm. (*C. W. L.*)

Enterprise, Florida, October 30, on poke berry; collected by C. L. Brownell. Type in author's collection; another specimen in Chas. Schæffer's collection.

IV. Eusphyrus Lec., 1876. (Gr., "beautiful" + "feet.")

Beak shorter than head, broader than long, slightly narrowed at base; eyes ovate, broadly emarginate in front; antennæ not longer than head and thorax, first and second joints short and thick, 3–6 slender, 7 and 8 thicker, 9—11 broader, forming a loose, compressed club; front coxæ prominent, contiguous; tarsi as long as the tibiæ, first joint as long as the others united, third very short; claws with a small acute tooth near the base. One of the three North American species occurs with us.

12 (9213). Eusphyrus walshii Lec., 1876, 399.

Elongate-oval. Brownish-black, clothed with fine brownish or ash-gray pubescence, and mottled with patches of coarser yellowish-white hairs arranged in a cross-band on elytra much as in *Ormiscus saltator;* antennæ at base, tibiæ and tarsi pale reddish-brown. Thorax wider at base than long, gradually narrowed from the base forward, hind angles acute, divergent, projecting laterally beyond the elytra; disc finely and densely punctate, the transverse ridge almost basal. Elytra subcylindrical, not wider and about twice as long as thorax; striæ deep, coarsely and closely punctured; disc feebly and broadly impressed transversely about one-fourth the length from base. Length 2.3—3 mm.

Putnam and Posey counties, Indiana, rare; Apr. 16—July 4. Staten Island, N. Y., on hickory; June. Various localities in New Jersey, breeding in the dead wood of deciduous trees; June, July. Ormond, Fla., April 13. Ranges from New England and Canada to Michigan and Iowa, south to Florida.

V. Gonotropis Lec., 1876. (Gr., "elbow" + "keel.")

Here belongs a single rather robust convex species having the beak longer than head, gradually narrowed to middle, then widened to tip, its upper surface uneven; antennal cavities near its tip small, deep, not visible from above; antennæ half as long as body, first joint clavate, second shorter, 3—8 more slender,

each sub-equal in length to first; 9—11 forming an elongate, sub-cylindrical club; scutellum small, elevated, with a small deep fovea behind.

13 (9203). GONOTROPIS GIBBOSUS Lec., 1876, 394.

Subovate, convex. Black without lustre; beak, sides of head below the eyes and scutellum densely clothed with fine white pubescence; elytra with a large saddle-shaped spot of similar pubescence extending from the middle forward to base and gradually narrowed to the space between the third intervals; also with some smaller white and black pubescent spaces behind the middle; beneath pruinose with fine whitish pubescence. Thorax narrowed from the base forward, broadly channeled behind the middle and with a short, deep transverse line at the middle, the edges of the cruciform impression thus produced clothed with white pubescence; disc broadly concave near the sides adjacent to the transverse ridge. Elytra wider than base of thorax; striæ finely punctate; intervals densely and finely punctured, the third with an oblong tubercle near base and another behind the middle. Length 5 mm.

Paris, Maine, July 4. Tyngsboro, Mass.; Blanchard collection. Described from Colorado. Known also from Minnesota and Montreal, Canada, northward to Cumberland House in Hudson Bay Region. Rare in collections.

VI. EURYMYCTER Lec., 1876. (Gr., "broad" + "nose.")

Oblong, robust, coarsely sculptured species having the beak narrower than head, strongly dilated at tip, with three ridges and four wide grooves above; eyes rounded, finely granulated; antennal foveæ deep, visible only from above; antennæ half as long as body, first and second joints stouter, nearly equal, 3—8 slender, longer, shining, 9—11 forming an elongate loose club; first and fifth ventral segments longer than the others. One species is known.

14 (9204). EURYMYCTER FASCIATUS Oliv., 1795, 80, p. 9.

Dark or sooty brown with a conspicuous patch of white pubescence on the beak and a broad transverse band of same behind the middle of elytra. Thorax very uneven, broadly impressed before the middle; ante-basal ridge about one-fifth from base, bent on sides at an obtuse angle, forming an obtuse lateral protuberance. Elytra wider than thorax, disc very uneven with short rugosities and rows of large distant punctures. Length 6.5—9.5 mm.

Wells and Posey counties, Indiana; June 10. Many localities in New Jersey, but usually rare; May 31—August 2. Ranges across the continent from New England and Canada to Vancouver and Oregon, south in the eastern portion to Florida and

Texas. Occurs on dead twigs and on fungus growing on dead beech. Easily known by its large size, snow-white markings and rough sculpture.

VII. Tropideres Schön., 1826. (Gr., "keel" + "neck.")

Rather slender, oblong or subcylindrical species having the beak wider than long, not longer than head, antennal foveæ not visible from above; eyes oblique, slightly oval, more widely separated than in *Eurymycter;* antennæ slender, not reaching base of thorax, first and second joints oblong, much thicker than 3—8 which are slender, subequal, 9—12 stout, forming a short flattened club; thorax subconical, wider at base than long; scutellum minutely rounded; elytra but slightly wider than thorax; ventral segments subequal in length. Two species are known from North America.*

15 (9205). Tropideres bimaculatus Oliv., 1795, 80, p. 14.

Oblong, rather slender. Black with numerous scattered tufts of dark hair; thorax with two small round whitish spots, and an elongate one in front of scutellum; elytra each with a humeral spot and a common transverse subsutural one behind the middle, grayish-white; tibiæ annulate with grayish. Thorax with sides rounded, feebly, obtusely tuberculate; disc uneven, coarsely and sparsely punctate; ante-basal ridge obtusely angulate at the middle with angle directed forwards, and obtusely bent on the sides. Elytra slightly wider at apical fourth than at base; disc with irregular rows of rather coarse, deep, close-set punctures. Length 4.5 –4.8 mm.

Posey Co., Indiana, scarce beneath bark of honey locust and soft maple; April 19—Nov. 8, Newark, New Jersey, Lowell, Mass. Ranges from New England to Wisconsin, south to South Carolina. Occurs on dead twigs and beneath bark.

16 (9206). Tropideres rectus Lec., 1876, 395.

Oblong-subcylindrical. Dark brown irregularly maculate with yellowish pubescence; elytra also with a few white dots; legs annulated with gray; beneath thinly clothed with very fine grayish-yellow hairs. Thorax much wider than long, sides obliquely and broadly rounded into the apex, which is also broadly rounded; disc densely and finely punctate, the ante-basal ridge nearly straight, parallel to the base, suddenly bent at sides almost at right angles and extending nearly to the middle. Elytra with rows of large punctures; intervals even, alternately variegated with distant small white dots. Length 4 mm.

*Bovie (1905) states that the true *Tropideres* do not occur in America, and provisionally attaches some American species to *Goniocleus* Jordan. Until Dr. Jordan's classification appears in Genera Insectorum, it is difficult to say whether all our species should be so characterized, or a new genus erected for them. In the meantime it seems best to retain Schönherr's generic name.

Seacoast of New Jersey, rare. Indian River, Sand Point, and Enterprise, Fla., March 25—April. Recorded elsewhere only from Ohio and District of Columbia. Occurs on dead branches and twigs. The club of antennæ is more slender than in *bimaculatus* and the upper surface much less uneven than there.

VIII. ALLANDRUS Lec., 1876. (Gr., "different" + "tarsi.")

Beak longer than head, narrowed at base, slightly dilated at tip, above with a high crest on basal half in male, feebly carinate, female; antennæ of female reaching base of elytra and formed much as in *Tropideres*, the second joint more slender; of male as long as body, joints 3—8 very elongate, 9—11 flattened, forming a loose club; eyes rounded, prominent, finely granulated; tarsi more slender than usual, third joint not as wide as second, claws appendiculate. One species is known.

17 (9207). ALLANDRUS BIFASCIATUS Lec., 1876, 396.

Oblong, subcylindrical. Blackish-brown with a brassy tinge; elytra with two ill-defined bands of ash-gray hairs, the front one extending along the suture to base; scutellum white; head and thorax densely punctured, thinly clothed with ash-gray hairs. Thorax longer than wide, narrowed at tip and base, finely and densely punctate; the transverse ridge remote from base, feebly curved, subsinuate, flexed obliquely forward at sides. Elytra not as wide as thorax at middle; striæ fine, punctured. Length 3.5—4.3 mm.

Not yet recognized from Indiana though undoubtedly occurs. New Jersey on linden. Bowmanville, Ill., July 27. Ranges from New England and Canada to Wisconsin, Utah and Idaho, on a line north of the Ohio River. Utah specimens are black instead of brown. Hamilton in place of above cites *Allandrus* n. sp., which however, Klages (1901, 294) says is *bifasciatus*.

Tribe II. ANTHRIBINI.

In this tribe the antennæ are inserted under the sides of the beak; transverse ridge of thorax basal, reaching the hind angles and there (except in *Anthribulus*) bent forward at a right angle along the sides, thus forming an apparently elevated margin of base and posterior portion of sides of thorax. The basal margin of elytra is also elevated and acute to correspond with that of thorax.

KEY TO EASTERN GENERA OF ANTHRIBINI

a. Beak with sides parallel or nearly so.
  b. Tarsi with third joint wider, deeply bilobed, visible from above.
    c. Front coxæ contiguous or nearly so; antennal cavities distant from the eyes.

d. Claws almost cleft; body elongate-cylindrical; eyes broadly emarginate in front; length 7.5 or more mm.
IX. PHŒNICOBIELLA.

dd. Claws feebly toothed at base; body stout, subcylindrical; eyes oval, entire; length less than 7.5 mm. X. PIEZOCORYNUS.

cc. Front coxæ well separated by the prosternum; antennal cavities extending to or nearly to the eyes.

e. Eyes rounded. XI. ANTHRIBUS.

ee. Eyes broadly emarginate. XII. TOXONOTUS.

bb. Tarsi with third joint feebly bilobed, not visible from above; antennal cavities reaching the eyes. XIII. EUPARIUS.

aa. Beak gradually narrowed from the eyes forward; length less than 4 mm.

f. Basal ridge of thorax bent abruptly forward at hind angles and usually continued along the sides for a short distance.
XIV. BRACHYTARSUS.

ff. Basal ridge gently rounded, becoming obsolete at hind angles.
XV. ANTHRIBULUS.

IX. PHŒNICOBIELLA Cockerell, 1906.

Beak about as long as wide, finely carinate, emarginate in front; sides acutely elevated in male, less so in female, forming a ridge above the antennal cavities which are large and deep; antennæ of male much longer than body, second joint one-half the length and much thinner than first; 3–5 very long and slender, 6—9 gradually shorter, fringed beneath with short curled hairs, 10—11 slightly thicker, similarly fringed, together equal to ninth, eleventh pointed and feebly curved; of female three-fourths as long as body, joints 9—11 broader, forming a loose elongate club; scutellum small, round, not depressed; ventral segments gradually shorter, fifth broadly emarginate; third joint of tarsi broadly dilated and with a dense brush of stiff hairs beneath. One of the two species occurs with us. The name *Phœnicobius* Lec. was preoccupied.

18 (9214). PHŒNICOBIELLA CHAMÆROPIS Lec., 1876, 400.

Elongate-cylindrical. Brown, mottled with fine gray, yellow, fulvous and black pubescence; elytra with the first and alternate intervals slightly more convex, tessellated with black and yellow, the intervening spaces with ash-gray hair; under surface, legs and antennæ also mottled with gray and dark brown pubescence, metasternum densely clothed with yellowish-white pubescence; outer half of ninth and all of tenth and eleventh joints of antennæ sooty black. Length 7.3—11 mm.

Tybee Island, Georgia, June 26. Enterprise, Florida, Oct. 7. Common at Ft. Capron, Haulover and Enterprise, Fla., on fresh cut leaves of the cabbage palmetto, April, May, October, November.

X. PIEZOCORYNUS Schön., 1839. (Gr., "compressed" + "club.")

Three species, ranging from 4 to 7 mm. in length, stout and subcylindrical in form, with large oval, coarsely granulated eyes and the front coxæ contiguous or nearly so, compose this genus. They have the beak broad, flat, not so long as wide, not emarginate at tip; antennal cavities large, deep, partially covered by the sides of beak; antennæ with first joint stout, rounded, second nearly twice as long, conical, 3—8 more than twice as long as second, slightly thickened toward tip, 9—11 forming a compressed, elongate club. Thorax wider than long, truncate at base, the ridge as described under tribal heading; third joint of tarsi deeply bilobed, wider than second, the latter broad, triangular and emarginate.

KEY TO SPECIES OF PIEZOCORYNUS.

a. Ninth and tenth joints of antennæ obliquely emarginate at tips; thorax with two shallow depressions and three elevations occupying the middle third; antennæ of male one-half the length of body; length 7.5 mm. 19. DISPAR.

aa. Ninth and tenth antennal joints not emarginate; thorax with impressions and elevations less marked; antennæ in both sexes shorter than body.

b. Pubescence mottled yellow, brown and black; length 4.7—6 mm. 20. MIXTUS.

bb. Pubescence nearly black; length 4 mm. 21. MŒSTUS.

19 (9215). PIEZOCORYNUS DISPAR Gyll., Schön., 1833, 140.

Elongate, subcylindrical. Sooty-black, rather thickly clothed with dark brown and dull yellow pubescence, the latter forming a line bordering the eyes and small spots in front of thorax at middle, and concentrated in a few small scattered spots and a broad common sutural patch on the elytra, the patch extending from the scutellum to the declivity and broader in front; legs, including the tarsi, annulated with grayish-yellow. Ninth and tenth joints of antennæ obliquely emarginate at tip, the 10th and 11th joints together shorter than ninth. Head, beak and thorax densely and finely reticulate-punctate. Elytra not wider than and about three times as long as thorax, sides subparallel or very feebly diverging from base to apical fifth, then broadly rounded to apex; disc with feebly impressed rows of small, very close-set punctures; third and fifth intervals slightly elevated and with alternating oblong spots of pale and dark pubescence. Length 6—7.5 mm.

Wells and Crawford counties, Indiana, scarce; June 24—July 1. Carbondale, Ill., June 22. Ranges from Buffalo, N. Y., and Pennsylvania to Missouri and Texas. Occurs on old logs and under loose bark; also in fungus on dead beech and probably other trees. Originally described from Brazil.

20 (9216). PIEZOCORYNUS MIXTUS Lec., 1876, 402.

Oblong, cylindrical. Brown, opaque; thorax thinly, elytra thickly clothed with short, prostrate brown, gray and dull yellow hairs, the latter predominating on the elytra, the gray forming a large patch on head and small spots on the alternate intervals of elytra; legs annulate with gray. Antennæ very slender, joints of club subequal in length, 10th and 11th a little shorter than the 9th, the 10th not narrower. Head and thorax very densely punctured, the latter narrowed in front, not rounded at sides. Elytra each with an obtuse elevation on basal fourth of second and third intervals; striæ with deep, close-set punctures; intervals tessellated. Length 4.7—6 mm.

Jennings Co., Indiana, scarce; sifted from debris at base of maple trees; November 20. Avalon, Sea Isle, Ocean City and Anglesea, N. J.; June—August. Ranges from New Jersey to southern Indiana, south to Florida. Occurs in same places as does *dispar*.

21 (9217). PIEZOCORYNUS MŒSTUS LeConte, J. E., 1824, 172.

Resembles the preceding but smaller and more robust. Pubescence finer and of a grayish-black color, tessellated with black on elytra; the only white spots being two small dots on the thorax, one at middle of apical margin, the other in front of the white scutellum; legs annulated with dark gray. Length 4 mm.

Brigantine Beach, New Jersey, rare; September. Known also from District of Columbia, Georgia and Florida. Occurs rarely on dead branches, old logs and under loose bark.

XI. ANTHRIBUS Geoff., 1764. (Gr., "a flower" + "to destroy.")

Oblong or subcylindrical species having the beak wider than long, flat with sides parallel; eyes rounded, convex, coarsely granulated; antennæ half as long as body, second and fourth joints equal, each somewhat longer than third, 4—8 slightly diminishing in length and increasing in thickness, 9—11 forming a compressed oval club. First joint of tarsi slightly longer than second, the latter triangular and emarginate, third as wide as second, deeply bilobed; claws acutely toothed at middle.

KEY TO EASTERN SPECIES OF ANTHRIBUS.

a. Pubescence tufted; elytra with a large transverse white spot in front of middle. 22. CORNUTUS.

aa. Pubescence short, uniform, dense yellow-gray. 23. LIVIDUS.

22 (9218). ANTHRIBUS CORNUTUS Say., 1831, 4; ibid, I, 262.

Elongate, subcylindrical. Brown with conspicuous tufts of dark hair

Fig. 29. × 7. (After Marlatt.)

on thorax and elytra and a common transverse white spot in front of the middle of latter. Beak feebly carinate above. Thorax convex, as wide as long, the ridge on sides sinuous, reaching the middle; disc with five tufts of hair. Elytra cylindrical, not wider than thorax; disc with feebly impressed rows of rather large punctures. Length. 3.5—5.8 mm. (Fig. 29.)

Jackson, Clark and Posey counties, Indiana, scarce; May 12—July 22. Jamesburg, Da Costa, Atco and Cape May, N. J.; May 10—July. Dunedin, Fla., frequent; Jan. 24—March 31. Ranges from Ontario, Canada, south to Florida and Texas and west to Missouri. Occurs on dead branches, especially of oak, and on woody fungi. Taken at light at Enterprise, Fla., Nov. 26.

23 (9219). ANTHRIBUS LIVIDUS Lec., 1876, 403.

"Elongate-cylindrical. Brown, densely clothed with short depressed, mud-colored hairs, club of antennæ dark. Beak entirely flat, not at all carinate. Thorax longer than wide, slightly rounded on sides, narrowed from middle to apex which is broadly rounded. Elytra with striæ composed of small distant punctures, entirely even and equal in width. Length 4.4 mm." (*LeConte.*)

Lake Harney, Sebastian River, Florida, one specimen. Wilmington, N. C., April 16, on ocean beach. (*Davis.*) For some reason, to us unknown, this species is transferred to *Brachytarsus* in Bovie's Catalogue.

XII. TOXONOTUS Lac., 1866. (Gr., "curve" + "back.")

Beak flat, as long as wide, emarginate in front, feebly carinate; antennal cavities large, deep, almost reaching the eyes; antennæ of male longer than body, of female half as long, first joint cylindrical, robust, half as long as second, the two together equal to third, 3—8 slender, subequal, 9 clavate, its outer half united with 10 and 11 to form a slender, loose club; fourth ventral segment shorter than the others; legs thickly clothed with erect, flying hairs; first joint of tarsi in male prolonged as a sharp spine.

24 (9220). TOXONOTUS FASCICULARIS Schön., 1833, 132.

Oblong, subcylindrical. Brown, densely clothed with ash-gray, white and yellowish hairs, the latter covering the beak, forming a conspicuous patch each side of front half of thorax and a line along each elytral interval; the white hairs condensed into a conspicuous spot on declivity of elytra. Thorax convex, strongly narrowed in front; disc with three promi-

nent tubercles in a line across the middle. Elytra each with a large tuft of brown hair on basal fourth, scattered smaller tufts on disc and a protuberance each side of the white apical patch; striæ represented by rows of minute distant punctures. Length 6.5—9.2 mm.

Dunedin, Florida, rare; April 4. Common at Biscayne Bay; Marco, April 19; Key West. Originally described from Cuba.

XIII. Euparius Schön., 1833. (Gr., "beautiful" + "elbow.")

To our species usually listed under *Cratoparis* the name *Euparius* Schön. has been recently restored by Bovie. Aside from the characters given in keys, they have the beak flat, as long as head; eyes oval, prominent, coarsely granulated; antennæ short, reaching base of elytra in both sexes; joints 1 and 2 stout, subequal, third slender, twice as long as second, 4—8 gradually shorter, 9—11 larger, forming a loose compressed club (Fig. 12, *c*); thorax with side margin reaching middle, base feebly bisinuate with its lower margin well defined, thus causing the transverse ridge to appear as if not basal.

25 (9221). Euparius marmoreus Oliv., 1795, 80, p. 12.

Elongate-oblong, robust. Sooty brown, rather thickly clothed with pale brown and grayish-yellow hairs, the latter covering the beak, apical third of thorax and forming a large common sutural spot, concave behind, near middle of elytra, this usually bordered behind by a black bar; remainder of surface mottled; legs annulate with gray and black or dark brown. Thorax strongly narrowed and with sides concave in front; disc with a wide, shallow feebly carinate median groove, coarsely and densely punctate. Elytra not wider than thorax; disc with rows of rather coarse, deep, close-set punctures; alternate intervals slightly more elevated. Length 3.5—8.5 mm.

Common throughout Indiana; March 31—November 8. Hibernates as imago beneath logs and partly rotten beech and maple stumps; taken mainly in woody fungi on oak logs and stumps; in August from flowers of goldenrod and thoroughwort. Common throughout New Jersey, May to August, on tree fungus and dead trees, developing in fungus-attacked logs and stumps. Ormond, Kissimmee and Dunedin, Fla.; frequent on woody fungi; Feb. 1—April 4. Ranges from New England and Ontario to Iowa, south to Florida and Texas. Varies much in size (one specimen from Florida being only 3.5 mm. in length) and in mottlings, so that numerous synonyms have been created by foreign writers. Usually listed as *lunatus Fab.*, but Olivier's name has priority by six years.

26 (9222). Euparius lugubris Oliv., 1795, 80, p. 13.

Oblong, robust. Velvety black varied with white, the latter usually covering beak (Fig. 26), apical third of thorax and forming a large, very

irregular patch on disc of elytra which usually extends to base and encloses a quadrate black scutellar space; apex of elytra white; legs annulate with black and white. Thorax less uneven than in *marmoreus*, the median groove almost obsolete. Length 4—7 mm.

Vigo, Lawrence, Perry and Posey counties, Indiana, scarce; April 25—Oct. 20. Mobile, Alabama, April 11. A member of the Austroriparian fauna ranging from District of Columbia to Arkansas, south to Florida and Texas. Occurs mainly in partly woody white fungi growing on old logs and stumps.

XIV. BRACHYTARSUS Schön., 1826. (Gr., "short" + "tarsus.")

Short, stout species, somewhat resembling *Bruchus* in form and at times imitating their habits, but usually found on smut of corn or similar fungus growths. The antennæ are as long as head and thorax, joints 1 and 2 stout, the second slightly the longer, 3—8 shorter, 9—11 forming an oval, compressed club; eyes coarsely granulated, emarginate in front; thorax rounded in front, overhanging the head, basal ridge as described in key; elytra with even and equal intervals; tarsi with first joint scarcely longer than second, which is triangular and emarginate, third deeply bilobed, as wide as second, claws toothed near tip, so as to appear cleft. The larvæ are said by Sharp, Comstock and Walsh to prey on *Coccidæ*, but we can find no definite record of our American species being thus beneficial.

KEY TO EASTERN SPECIES OF BRACHYTARSUS.

a. Legs annulated; elytra tessellated on alternate intervals. 27. ALTERNATUS.

aa. Legs not annulated.

b. Elytra each with two dark spots, one basal, the other behind the middle. 28. STICTICUS.

bb Elytra without dark spots.

c. Form short and stout; length less than 2.3 mm.

d. Pubescence mostly brown; ante-basal ridge extending forward on sides one-third the length of thorax; length 2—2.2 mm. 29. TOMENTOSUS.

dd. Pubescence mostly gray; ante-basal ridge scarcely extending forwards; length 1.3—1.8 mm. 30. PAULULUS.

cc. Form more elongate; elytra more or less mottled with paler dots; length 2.2—3.2 mm.

e. Pubescence coarse and dense, yellowish-gray. 31. LIMBATUS.

ee. Pubescence finer, scarcely mottled; body more elongate than in *limbatus*. 32. PLUMBEUS.

27 (9223). BRACHYTARSUS ALTERNATUS Say, 1827, 250; ibid, II, 314.

Oblong-oval, robust. Dark brown, thickly clothed with pale brown, dark velvety brown and ash-gray hairs; elytra with rows of alternate gray and dark brown spots; antennæ reddish-brown, last three joints fuscous;

legs brownish, tibiæ with dusky bands, femora dusky. Beak flat, shorter than head. Thorax convex, wider at base than long, densely and finely punctate, tessellated with dark spots. Elytra broadly oval; striæ fine, their punctures fine, close-set. Length 2.5—3.2 mm.

Southern half of Indiana, frequent. March 31—June 12. Pawpaw Lake, Michigan, Aug. 7. Ft. Lee and Hudson county, New Jersey. Ranges from New England and Ontario to Iowa, south to Florida and Texas. Usually taken by sweeping meadows and low vegetation. Has been reported as breeding in stored corn, peas and cowpeas,* but not generally regarded as of economic importance. Bred from the fungus *Cystopus ipomœa-pandurana*, parasitic on dodder, in Ohio; also from stem of wild rye, *Elymus virginicus* L. in Illinois (*Webster*). Pierce (1907, 295) has bred it in abundance from stems of a Compositæ, *Siderianthus rubiginosus* T. & G., in Texas, the eggs being laid in the tender lateral stem buds and at the base of the flower heads, the larvæ feeding in narrowly separated cells and pupating in cells of brown dust.

28 (9229). BRACHYTARSUS STICTICUS Boh., Schön., 1833, 172.

Oblong, rather slender. Brown, thickly clothed with very short, dark brown and grayish-yellow hairs; thorax much varied with sooty brown, which does not extend on the front margin; elytra each with numerous small, rounded and two larger dark spots; antennæ pale reddish-brown, last three joints fuscous, legs pale rufous, femora dusky at middle. Head flat, dusky, paler toward apex of beak. Thorax convex, finely and densely punctate, the basal ridge extending along the sides for nearly half their length. Elytral striæ very fine, obsoletely punctate. Length 2.5—3 mm. (Fig. 30.)

Fig. 30. × 15. (After Forbes.)

Common throughout Indiana, Jan. 6—June 2. Taken by sweeping low herbage, sifting woody debris and on flowers of button-bush, *Cephalanthus occidentalis* L.; the January specimen beneath log near border of pond. Staten Island, New York, June. Throughout New Jersey, south of the Piedmont Plain, May—July. Sanford and Dunedin, Fla.; April 3—Oct. 31. Ranges from New England and Quebec, Canada, to Iowa, south to Florida. Breeds in the smut of corn and wheat, "Mr. Lea having taken 80 individuals from six heads of wheat." (*Say.*) The two spots of each elytron are sometimes united by a black

*Quaintance, Ent. News, VIII, p. 1.

sutural line and "varieties occur in which the spots are obsolete, and which are then separable from *limbatus* only by the narrower form and more elongate thorax." (*LeConte.*) Usually known as *B. variegatus* Say, but Jordan states* that this name was preoccupied by Fourcroy (1785) for a European species. *B. stictieus* Boh. and *B. obsoletus* Fahr. are both synonyms, the former having priority by six years.

29 (9228). BRACHYTARSUS TOMENTOSUS Say, 1826, 251; ibid, II, 315.

Oval, robust. Dark reddish-brown, antennæ and tibiæ paler; terminal joint of tarsi blackish and antennæ fuscous at tip; above thickly covered by short, fine, brownish or grayish-yellow hair. Thorax convex at middle, slightly depressed before the base, its hind angles acute, the ridge extending forward on sides about one-third their length. Elytra with fine punctured striæ. Length 2—2.2 mm.

Starke and Steuben counties, Indiana, scarce; June 18—Aug. 23. Common throughout southern New Jersey. Ranges from New England to Michigan, south to Florida. Occurs sometimes abundantly on ragweed, *Ambrosia artemisiæfolia* L.

30 (——). BRACHYTARSUS PAULULUS Casey, 1884, 194.

Oblong-oval, strongly convex. Black, above thickly clothed with fine prostrate gray and brownish hairs, the latter more evident on middle of disc of thorax and elytra, but more or less evenly intermixed with the gray throughout the surface; beneath sparsely clothed with gray hairs; tibiæ, tarsi and basal joints of antennæ pale reddish-brown. Head and beak black, shining, very finely and densely granulate. Thorax at base slightly wider than long, sides almost straight and evenly converging from base to apex, the latter obtusely rounded and one-half the width of base; disc with hind angles acute, the sculpture hidden by scales. Elytra oblong, sides straight to apical fifth, then broadly rounded to apex; striæ fine, rather coarsely punctate; intervals feebly convex, minutely punctulate. Length 1.3—1.8 mm.

Putnam Co., Ind., Sept. 21. Taken from pod of the bladdernut, *Staphylea trifolia* L. Described from Delaware. Casey reports it also from Asheville and Black Mountains, North Carolina. Placed as a synonym of *tomentosus* by Henshaw, but in our opinion a very distinct species.

31 (9225). BRACHYTARSUS LIMBATUS Say, 1826, 250; ibid, II, 314.

Brownish-yellow or pale reddish-brown, clothed with short, pale yellowish-gray hair; elytra mottled with paler; antennæ and legs reddish-brown, dusky beneath. Thorax with the line of the hind margin promi-

*Ann. Soc. Ent. Belg., 1905.

nent, slightly undulated, approaching the posterior edge in the middle. Elytral striæ subacute, narrow, their punctures not large. Length 2.2—3.1 mm.

Bainbridge, Georgia; July 15. Known from Illinois, Pennsylvania and District of Columbia. "Lake Ashley and Cedar Keys, Fla.; rare on swampy meadows." (*Schwarz.*) Raised by Schwarz from flower heads of the fine-leaved sneezeweed, *Helenium tenuifolium* Nutt.

32 (9226). Brachytarsus plumbeus Lec., 1876, 406.

Oblong, cylindrical. Black, densely clothed with ash-gray pubescence, not mottled; antennæ and legs testaceous, club and thighs darker. Thorax with ridge extending forward on sides only one-third their length, not one-half as in *limbatus*. Striæ of elytra fine, punctured. Length 3.2 mm.

Highlands, New Jersey. Middle States. "Of the same form as *limbatus*, but a little narrower, the pubescence finer and of a uniform gray color." (*LeConte.*)

B. vestitus Lec., loc. cit., pubescence coarse and dense, brownish-yellow, not mottled, length 2 mm., was described from Louisiana and is reported as occurring at Agricultural College, Miss., in November.

XV. Anthribulus Lec., 1876. (A small *Anthribus.*)

Here belongs one small species differing from the *Brachytarsi* in having the form more slender; sides of thorax broadly rounded, the basal ridge only obtusely bent at the outer ends, not continuing along the sides; elytra slightly narrowed and rounded near base, claws cleft at tips for about one-fourth their length.

33 (9230). Anthribulus rotundatus Lec., 1876, 406.

Oblong-oval, convex. Dark brown, densely clothed with very fine silvery gray and brown pubescence, antennæ and legs reddish-brown, club dusky. Thorax longer than wide, gradually narrowed in front, sides and apex broadly rounded, hind angles obtuse, slightly rounded. Elytra oval, convex, slightly wider than base of thorax, humeral angles rounded, striæ deep, punctured. Length 1.4—2.4 mm.

Throughout southern New Jersey; May 21—August 14. Tybee Island, Georgia, April 20. Dunedin, Fla., Jan. 29—Apr. 4. Ranges from Massachusetts to Florida and Louisiana in the coastwise states and reaches Mexico. Occurs in swampy meadows, on flowers of huckleberry, etc.

Tribe III. ARÆOCERINI.

This tribe comprises small species having the antennæ inserted in small foveæ upon the upper surface of base of beak; an-

tennæ slender, the last three joints forming a loose club; transverse carina of thorax basal, bent at right angles and extending a short distance along the sides; elytra regularly striate. Two genera represent the tribe in this country.

KEY TO GENERA OF ARÆOCERINI.

a. Second joint of antennæ shorter than first; eyes rounded.
XVI. ARÆOCERUS.

aa. Second joint of antennæ as long as first; eyes subovate.
XVII. CHORAGUS.

XVI. ARÆOCERUS Schön., 1826. (Gr., "slender" + "horn.")

Beak short, wide, deflexed, the apex truncate; eyes rounded, prominent; thorax short, transverse, base bisinuate, hind angles subacuminate; elytra oblong, convex, the apex obtusely rounded; other characters as above.

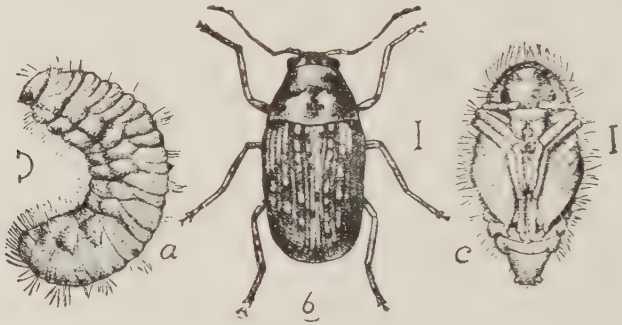

Fig. 31. *a*, Larva; *b*, adult; *c*, pupa. × 7. (After Chittenden.)

34 (9231). ARÆOCERUS FASCICULATUS DeG., 1775, 276.

Ovate, convex. Dark brown to black or piceous, clothed with yellowish and dark brown pubescence; intervals of elytra alternately tessellate with brown and yellowish; antennæ, tibiæ and tarsi reddish-brown, club fuscous; femora piceous at middle. Thorax very finely and exceedingly densely punctate. Elytra with rows of fine, close-set, feebly impressed punctures; intervals very finely and densely granulate-punctate. Length 2.5—4.5 mm. (Fig. 31.)

Dunedin, Florida, April 1. A cosmopolitan species, known as the coffee-bean weevil. Originated in India and recorded in the United States from Ohio, New Jersey, District of Columbia, Alabama, Mississippi and Florida. The larvæ attack seeds of cacao, coffee, poke berries and a variety of similar products, including, in the South, those of wild indigo, senna, cotton, and even dried apples. Chittenden (1897, 36) records a visitation in Washington, D. C., in 1895, in which the beetles, issuing in Au-

gust from sacks of Java coffee, attacked nearly everything edible in a grocery store until December. Motschulsky (1855, 77) records the importation of this species at the exposition in New York in 1853 with the agricultural products from Cayenne, the insects flying about as one approached the exhibits and continuing to develop during the summer months.

The beetle is very active, running, leaping and flying readily when disturbed, and is always liable to occur in seaports, but does not become acclimatized north of the cotton belt, though it feeds on a variety of plants. It closely resembles *Brachytarsus alternatus* Say in form, size and markings, but is easily separated by the position of the antennal foveæ.

XVII. Choragus* Kirby, 1818. (A mythological name.)

Small brownish or blackish species resembling dwarf forms of *Cryptocephalus* and having the beak short, flat, deflexed, dilated and subtruncate at tip; antennæ inserted on its upper basal surface, joints 1 and 2 robust, conical, subequal, 6—8 slender, elongate, 9—11 ovate-oblong; thorax convex, wider than long, much narrowed in front, the base subsinuate; scutellum minute; elytra as wide at base as thorax, subcylindrical; femora clavate, tibiæ almost straight, tarsi elongate. Four species occur in the United States.

KEY TO SPECIES OF CHORAGUS.

a. Larger, 2 or more mm.; form elongate-oval; elytra shining, 35. SAYI.
aa. Smaller, not over 1.3 mm.; form oval or oval-subcylindrical.
b. Body opaque without lustre; length 1.3 mm. 36. ZIMMERMANNI.
bb. Body shining.
c. Blackish-brown, finely pubescent; length 1.2 mm. 37. HARRISII.
cc. Piceous, not pubescent; length 1 mm. 38. NITENS.

35 (9233). Choragus sayi Lec., 1876, 408.

Elongate-oval, subcylindrical. Dark brown, the elytra paler, slightly pubescent; antennæ reddish-brown; tarsi piceous. Thorax minutely and densely punctured. Elytra deeply striate-punctate, shining; intervals less densely and more distinctly punctulate. Length 2.3 mm.

Orange Mts. and Jamesburg, New Jersey. District of Columbia, not rare on dead twigs. Ohio, in twigs of dead beech infested with fungus. Larger and narrower than the next with darker legs and shining elytra.

*Jordan (Biologia, p. 382) has erected a new genus, *Holostilpna*, with *Choragus nitens* Lec. as type. Until he treats the Anthribidæ of the world in Genera Insectorum we deem it premature to alter our nomenclature.

36 (9232). CHORAGUS ZIMMERMANNI Lec., 1876, 408.

Oval, subcylindrical. Brown, without lustre, slightly pubescent; antennæ and legs yellow. Thorax densely punctured. Elytra deeply striate-punctate; intervals densely and finely punctulate. Length 1.3 mm.

Tyngsboro, Mass., July 28. Fort Lee and Hemlock Falls, New Jersey. Ranges from New England to Florida, occurring on sweetgum, *Liquidambar styraciflua* L.

37 (9234). CHORAGUS HARRISII Lec., 1878, 626.

"Elongate-oval, subcylindrical. Blackish-brown, shining, finely pubescent. Thorax finely, less densely punctate, not opaque. Elytra with deep, coarsely punctured striæ; intervals not wider than the striæ, scarcely punctulate. Length 1.2 mm."

Detroit, Michigan, one specimen. "Differs from *zimmermanni* and *sayi* by being more distinctly (though very finely) pubescent and by neither the thorax nor elytra being opaque." (*LeConte.*) The types of *sayi* at Cambridge differ apparently only in size and it is very probable that *harrisii* will prove to be only a depauperate form of the larger species.

38 (9235). CHORAGUS NITENS Lec., 1884, 32.

Oval, convex. Piceous, shining. Thorax finely punctured. Elytra with the striæ fine, distinctly punctured. Length 1 mm.

Tyngsboro, Mass., one specimen in Blanchard collection. District of Columbia on dead twigs. The above brief description was published two years after LeConte's death by Dr. Horn as editor of his manuscript notes. "Quite different from the other three species in our fauna by the shining surface and smaller size." (*LeConte.*)

Tribe IV. XENORCHESTINI.

Very small oval or ovate, strongly convex, glabrous species having the beak so short as to be not distinct from the front; antennæ inserted on the front, first and second joints longer and stouter; 3—7 shorter, more slender, subequal; eighth subtriangular, slightly wider; 9—11 wider, forming a loose club; thorax narrowed from the base forwards, transverse ridge basal, flexed at the hind angles, continuing a short distance along the sides; scutellum invisible; elytra not striate; tarsi with the first joint elongate, second triangular, emarginate, third bilobed; claws slender, simple. Two genera are represented in the United States.

KEY TO GENERA OF XENORCHESTINI.

a. Upper surface without punctures. XVIII. Xenorchestes.
aa. Thorax punctured; elytra with irregular double rows of punctures. XIX. Euxenus

XVIII. Xenorchestes Woll., 1854. (Gr., "strange"+Orchestes.)

39 (9236). Xenorchestes americanus Motsch., 1873, 251.

Gibbose, acariform, narrowed in front. Dark brown or black, glabrous, shining, elytra with submetallic tinge; antennæ and legs reddish-brown. Head obtuse, eyes slightly flattened. Thorax in front as wide as head, almost conical, wider behind, simply truncate at base. Elytra at base as wide as thorax, ovate and dilated behind. Length 1.5 mm.

Mobile, Ala., found on bushes. (*Motsch.*) Biscayne, Fla. "Florida and Texas." (*LeConte.*)

XIX. Euxenus Lec., 1876. (Gr., "beautiful" + "host.")

LeConte states that the only evident differences between this genus and the preceding are the punctured surface and less ovate form of body in *Euxenus*. The species have the general appearance of minute *Cryptocephalids*. Two species are known.

40 (9237). Euxenus punctatus Lec., 1876, 409.

"Oval, very convex, slightly narrower in front. Brownish-black, glabrous, shining; sides of elytra piceous, legs and base of antennæ testaceous. Head feebly punctulate. Thorax slightly wider at base than long, gradually narrowed from the base forward, apex broadly rounded, base nearly rectilinear; disc deeply but not coarsely punctured. Elytra scarcely wider than base of thorax and punctured similarly, except that the punctures are arranged in irregular double rows, with narrow intervening smooth spaces. Beneath brownish, punctured; ventral segments short, equal. Length 1.2 mm." (*LeConte.*)

Detroit, Michigan; Canada. District of Columbia, on twigs, rare. (*Ulke.*)

41 (9238). Euxenus piceus Lec., 1878, 434.

Oval, rather elongate, convex. Dark reddish-brown, shining. Thorax sparsely punctulate. Elytra punctured, the punctures forming indistinct striæ towards the sides; two outer striæ distinct, the outermost extending from the base for one-third the length, the inner one entire, marginal stria entire. Length 0.6 mm.

Tampa, Florida, April 11, on dry palmetto leaves. Lake Poinsett, Crescent City and Haw Creek, Fla, on cabbage palmetto. "Differs from *punctatus* by the much smaller size, less distinctly punctured thorax and by the legs being not testaceous but dark, with only the tarsi yellowish." (*LeConte.*)

Family III. CURCULIONIDÆ.

The Curculios or Weevils.

A family of very large size comprising the great majority of all Rhynchophora. Its principal distinguishing characters are the presence of a definite, well developed beak, which is usually long and curved downward; labrum absent except in the first subfamily; palpi short, rigid, nearly always concealed within the mouth; elytra, except in the first four small subfamilies, each with a strong fold on the under side and near its outer edge, which limits a deep groove in which the upper edge of the abdomen fits.

In addition they have the head globose, mentum varying in size but never concealing the base of the maxillæ; antennæ usually elbowed or geniculate (straight in the first eight subfamilies) with the basal joint then much longer than any of the others and forming an angle with them; funicle 3—7 jointed; club distinct, composed of three joints, usually ringed or annulated; thorax varying in form and without sutures on the sides separating the prosternum; front coxal cavities enclosed behind; side pieces of mesosternum never reaching the coxal cavity; elytra without epipleuræ; pygidium usually covered, sometimes exposed; abdomen with five ventral segments, the first and second closely united; front and middle coxæ rounded, hind ones oval, more or less widely separated; tarsal claws variable.

More than 20,000 species of the family have been described and many new ones are discovered each year. Of these more than 1,400 are from America north of Mexico. The family name, Curculionidæ, is founded on the old Linnæan genus *Curculio*, which in turn was derived from the Latin and means a "cornworm" or "weevil."* The genus *Hylobius* is the nearest approach in this country to this old original genus.

The weevils feed chiefly on fruits, seeds and nuts, but no part of the plant is exempt from the attacks of either the larvæ or the mature insects; buds, leaves, twigs, flowers, fruits, bark, pith, galls and roots each being the special food of some Curculionid. The eggs are deposited by the mother beetle in the midst of the

*R. P. Dow in a letter to the authors states that "the word is curc = 'circle' + io, meaning, he who, or that which, alluding to the footless larva which curls up."

food and the larvæ are soft white maggot-like grubs, always destitute of legs, though in the place of the latter are often little elevations or papillæ which are sometimes surrounded or crowned by a circle of minute bristles. The form of the larvæ is subcylindric or rather convex, not flattened, and they have the head free, exserted and covered with a hard chitin and the mouth extending downward. When quiescent they assume the form of a curve, the front part of the body being a little thicker. Familar examples are the white "worms" found in chestnuts and hickory-nuts. Their jaws are strong and heavy and with them they gnaw those parts of the plants which serve for food. Most of the larvæ transform within the vegetable substances upon which they have lived; others, however, enter the ground and there change to pupæ and then to imagoes. The mature beetles are most of them diurnal in habit and love to rest upon foliage and enjoy the sunshine. Some are without inner wings and unable to fly. They walk slowly when disturbed but being without means of defense or organs of flight, they soon turn back their antennæ into the grooves beneath the head, fold their legs, let go all holds and tumble to earth. There they remain for some time before resuming activity, their dull color usually resembling that of the ground so closely that they readily escape notice.

Thirteen subfamilies of Curculionidæ are recognized in this work, all of which are represented in our territory. They may be separated by the following

KEY TO THE SUBFAMILIES OF CURCULIONIDÆ.

a. Antennæ straight, their grooves wanting.
  b. Club composed of completely separated joints. (Fig. 12.)
    c. Thorax without side margin.
      d. Labrum present; palpi well developed, flexible (Figs. 10, 11); form elongate-oblong. Subfamily I. RHINOMACERINÆ, p. 49.
      dd. Labrum absent; palpi short, rigid.
        e. Mandibles flat, toothed on inner and outer sides (Fig. 8); tibiæ with short terminal spurs at tip; claws free, bifid or acutely toothed; form usually elongate-oval, subdepressed. Subfamily II. RHYNCHITINÆ, p. 52.
        ee. Mandibles stout, pincer-shaped; tibiæ armed at tip with two strong hooks; claws connate at base; form short-oval, ro- Subfamily III. ATTELABINÆ, p. 61.
    cc. Thorax acutely margined and excavated beneath; three dorsal segments exposed; form very short, stout. Subfamily IV. PTEROCOLINÆ, p. 64.
  bb. Club composed of compactly united joints.

f. Pygidium concealed by elytra; trochanters large, femora attached to their apex (Fig. 14); form pear-shaped; size, small, not over 4.5 mm. Subfamily V. APIONINÆ, p. 65.

ff. Pygidium exposed; trochanters small.

g. First joint of antennæ longer than second joint (Fig. 13, *b.*)

h. Hind femora very broad, their outer margin strongly curved, crenulate; beak very slender, cylindrical; length 3.5 mm. Subfamily VI. ALLOCORHYNINÆ, p. 90.

hh. Hind femora normal; beak short and broad; length 12 or more mm. Subfamily VII. ITHYCERINÆ, p. 91.

gg. First joint of antennæ no longer than second joint (Fig. 13, *d.*); beak short, broad; hind coxæ very widely separated, their legs elongate, clasping (Fig. 15); length less than 3 mm. Subfamily VIII. TACHYGONINÆ, p. 93.

aa. Antennæ more or less completely elbowed, with the beak grooved for their reception (Figs. 6, 16); club compact.

i. Abdomen of male and female dissimilar, male with an additional anal segment; club of antennæ usually annulated, sensitive, not shining; tarsi usually dilated, third joint bilobed, brush-like beneath (Fig. 20), though narrow and setose in some subaquatic species.

j. Prosternum simple or grooved for reception of beak, never forming a triangular plate in front of the coxæ.

k. Beak never long and slender; mandibles with a deciduous cusp, leaving a scar (Fig. 7); habits often epigeal. Subfamily IX. OTIORHYNCHINÆ, p. 96.

kk. Beak usually elongate, slender, or if short and stout, received in the breast in repose; mandibles without scar; habits palustral or arboreal. Subfamily X. CURCULIONINÆ, p. 137.

jj. Prosternum forming a triangular plate in front of the coxæ; beak received in the breast in repose; tarsi narrow, not dilated. Subfamily XI. THECESTERNINÆ, p. 515.

ii. Abdomen in male and female alike, pygidium of both sexes undivided;* club of antennæ usually with its basal joint enlarged or shining or both (Fig. 13, *e., f.;* Fig. 16), feebly or not at all annulated; tarsi frequently narrow, not brush-like beneath.

l. Pygidium covered; buccal cavity as in Curculioninæ, peduncle of mentum short, oral organs exposed; funicle with number of joints frequently reduced. Subfamily XII. COSSONINÆ, p. 518.

ll. Pygidium exposed; buccal cavity elongate, peduncle of mentum elongate, narrow; funicle 6-jointed. Subfamily XIII. CALANDRINÆ, p. 547.

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*The anal segment of the male is quadrate and retractile in Calandrinæ, causing the abdomen to appear alike in both sexes; it is broader and less retractile in Cossoninæ but not, as in Curculionidæ, contiguous with the pygidium which is therefore undivided in both sexes.

Subfamily I. RHINOMACERINÆ.

The Pine-flower Snout Beetles.

The members of this small subfamily of snout beetles differ from the other Curculionidæ not only in appearance, but fundamentally in having the labrum present and distinct and the palpi usually slender and flexible (Figs. 10, 11.) With the subfamilies Rhynchitinæ, Attelabinæ and Pterocolinæ they form a division (the *Haplogastra* of LeConte) in which the elytra are without a fold on the under surface near the outer edge, and in which the pygidium of the two sexes are alike. In our species the head is prominent, not deflexed, beak as long as thorax, rather flat, narrowest about the middle and without antennal grooves; mandibles flat, curved, acute, toothed on the inner side (Figs. 10, 11); antennæ 11-jointed, straight, inserted at the side of the beak near tip, first joint stouter and sometimes one-third or more longer than second, joints 2—6 nearly equal, 7 and 8 slightly shorter and broader, 9—11 forming a loose, feebly developed club (Fig. 10); eyes small, convex, widely separated; thorax truncate before and behind; elytra punctured, not striate, rounded at tip, covering the abdomen, the latter with five free and nearly equal ventral segments; prosternal sutures distinct, widely separated, parallel in front, then curving inwards; front coxæ prominent, contiguous; hind ones transverse, reaching sides of abdomen; legs slender; tarsi 4-jointed, the third joint broad and deeply bilobed.

The typical genus, *Rhinomacer*, meaning "nose" and "long," was characterized by Fabricius in 1787, and on it a family was founded in 1817 by Leach, and retained by LeConte. More recent students, as Reitter in his "Bestimmungs Schlüssel," have regarded the Rhinomacerids as only a tribe or minor division of Rhynchitinæ, while others treat them as a subfamily of Curculionidæ. We follow the latter method as, in our opinion, the presence of the labrum and flexible palpi, combined with the other characters above given, are sufficient to justify the retention of the group as a subfamily coördinate with Rhynchitinæ, Attelabinæ, etc. Such a treatment, moreover, simplifies the classification of species by the average student and enables him the more readily to get at the scientific name of the insect in hand, this being the primary object of the authors in preparing this work. But six species of the subfamily, belonging to two genera, are known from North America. They occur on pine and

other coniferous trees, where they feed upon the staminate flowers in which the eggs are laid. Dr. LeConte has said (1874, 391) that they represent an old and undifferentiated form which "still clings to a very ancient and synthetic type of vegetation." To the Coleoptera genuina they connect through the Pythidæ, to which family they seem closely related both in structure and habits.

Synopses of the principal tribes or genera of the subfamilies Rhinomacerinæ, Rhynchitinæ, Attelabinæ and Otiorhynchinæ are given by

Pierce, W. D.—"Studies of North American Weevils," *in* Proc. U. S. Nat. Mus., Vol. 37, 1909, 325—364.

———— "Miscellaneous Contributions to the Knowledge of the Weevils of the Families Attelabidæ and Brachyrhinidæ," *in* Proc. U. S. Nat. Mus., Vol. 45, 1913, 365—426.

The subfamily Rhinomacerinæ is represented in the Eastern United States and Europe by a single genus, which does not apparently reach Central America.

I. RHINOMACER Fab., 1787. (Gr., "nose" + "long.")

From *Diodyrhynchus* Schönh., the other North American genus, this differs in having the maxillary palpi filiform and flexible instead of short and rigid. The beak is broader and more flattened in front of the antennæ, and the epipleuræ are much less distinct. The males of *Rhinomacer* differ from the females in having the front tibiæ longer and slightly curved inwards, the beak longer, more slender and less dilated at tip, and the fifth ventral with a slight median fovea. Our three eastern species have the pubescence longer and coarser than those from the west.

KEY TO EASTERN SPECIES OF RHINOMACER.

a. Body above uniform dark brown or fuscous; sides of thorax distinctly rounded.

b. Surface without a brassy tinge; thorax convex above; pubescence white, rather fine. 42. PILOSUS.

bb. Surface with a distinct brassy tinge; thorax flat or feebly concave above; pubescence reddish-brown, very coarse. 43. ELONGATUS.

aa. Head and thorax black or blackish, elytra pale brownish-yellow; sides of thorax almost straight. 44. PALLIPENNIS.

42 (8196). RHINOMACER PILOSUS Lec., 1876, 2.

Elongate-oblong. Uniform brown or blackish-brown, antennæ and legs but slightly paler. Beak slender, striate, feebly punctured. Thorax not longer than wide, sides strongly rounded, disc rather densely and finely punctured. Elytra parallel, elongate, coarsely punctured. Length 3—3.6 mm.

Lakehurst, New Jersey, April 22—26; Dunedin, Fla., Jan. 28. Ranges from Ontario and New England to Lake Superior and California, south to Mississippi and Florida. The Florida specimen has the first joint of antennæ one-third longer than second and the thorax less densely punctate than those from New England.

43 (8197). RHINOMACER ELONGATUS Lec., 1876, 2.

Elongate-oblong, more robust. Blackish or fuscous brown with a slight brassy tinge; antennæ, legs and apical half of beak distinctly paler. Beak stouter and more coarsely sculptured than in *pilosus*. Thorax slightly longer than wide, very densely and rather finely punctured, the sides broadly rounded. Length 3.6—4.5 mm.

Jamesburg, New Jersey, May 25; Tyngsboro, Mass., April 25; Toronto, Canada, May 15. Ranges from Ontario, New England and Marquette, Michigan, south to Alabama and Mississippi. Recorded as having been beaten from plum and peach trees in Georgia.

44 (——). RHINOMACER PALLIPENNIS sp. nov.

Elongate, slender, subparallel. Head, thorax and under surface blackish, feebly bronzed; elytra, legs and apical third of beak pale brownish-yellow; antennæ reddish-brown. Pubescence whitish, shorter, much finer and less dense than in *elongatus*. Beak rather stout, shorter than thorax, striate, coarsely and roughly punctate. Head coarsely and densely punctate. Thorax subquadrate, slightly narrowed in front, sides almost straight, slightly incurved near base; punctures of disc finer, less dense and more oval than those of *elongatus*. Elytra one-third wider at base and two and a half times longer than thorax, sides parallel to apical fifth, then rounded to apex, disc coarsely and rather densely punctate. Beneath finely, closely and shallowly punctate. Length 3.2—3.5 mm. (*W. S. B.*)

Mt. Washington, New Hampshire, July 7; Massachusetts and Canada, LeConte Coll.; New Jersey and Pennsylvania, Leng Coll. Mixed in cabinets with *elongatus*, with which it was confused by LeConte. At Cambridge two specimens of *pallipennis* are set by the side of his types of *elongatus*, all without locality labels. In another place were two specimens bearing the labels "Mass." and "Can." It was probably of the latter that he wrote, after his description of *elongatus*: "One female from Canada with pale brown elytra has the form and sculpture of the other four except that the thorax is scarcely at all rounded on the sides and is less densely punctured, and the elytra are still more elongated." From *elongatus*, *pallipennis* is easily separated by the characters given in key, as well as by the finer and paler pubescence, shorter and more slender form, and more distinct fovea of fifth ventral of male.

Subfamily II. RHYNCHITINÆ.

The Toothed Nose Snout Beetles.

This subfamily comprises a small group of snout beetles whose members are related to the Rhinomacerinæ but differ in having no labrum; in the mandibles being toothed on both inner and outer sides and capable of being spread widely apart (Fig. 8), and in the presence of distinct epipleuræ. When the mandibles are closed the outer tooth at the end of each extends forward so that two small acute teeth seem to project from the mouth. The inner elytral fold is very feeble, being short, straight and remote from the margin.

In addition to the characters mentioned, the Rhynchitids have the head prominent, not deflexed; beak slender, but feebly broader or flattened in front of the antennæ; maxillary palpi 4-jointed, short and rigid; antennæ 11-jointed, straight, the first joint not elongated and scarcely stouter, 2—8 slender, 9—11 broader and forming a loose club; eyes small, convex, widely separated; thorax convex, truncate before and behind; elytra separately rounded and exposing the pygidium in some genera; conjointly rounded and covering that segment in others; abdomen alike in both sexes with five free ventral segments slightly diminishing in length; front and middle coxæ conical, contiguous and prominent, hind ones transverse and reaching the elytra or nearly so; legs slender, tarsi brush-like beneath, 4-jointed, the third joint usually dilated and deeply bilobed; claws bifid or acutely toothed.

A family Rhynchitidæ was founded by LeConte in 1874, the name being derived from that of the typical genus *Rhynchites*, meaning "snout." By recent European authors this family has been combined either with the Attelabinæ or as a subfamily of Curculionidæ. We prefer, for reasons already stated, the latter arrangement. About 150 members of the subfamily are known, 31 of which have been described from the United States. Some of the species roll leaves and deposit in each roll an egg (Fig. 34); others deposit their eggs in young fruit, the kernel of which is eaten by the larva; still others place the eggs in young buds of trees which are destroyed by the grubs. In our species the body is rather elongate or pear-shaped; the side pieces of the mesothorax are diagonally divided, the epimera not ascending to protect the legs, while those of the metathorax are narrow and parallel. Four genera of the subfamily are recognized from the

United States, three of which are represented east of the Mississippi.

KEY TO EASTERN GENERA OF RHYNCHITINÆ.

a. Pygidium covered by elytra, the latter entire.
  b. Elytra not striate, more or less irregularly punctate; third joint of tarsi not dilated. I. AULETES.
  bb. Elytra striate, the punctures in rows; third joint of tarsi dilated. II. EUGNAMPTUS.
aa. Pygidium exposed, the elytra abbreviated, striate, the punctures in rows; third joint of tarsi dilated. III. RHYNCHITES.

I. AULETES Schönh., 1833. (Gr., "to play on a flute.")

Eight species of this genus are known from the United States, three of which occur in our territory.

KEY TO EASTERN SPECIES OF AULETES.

a. Antennæ inserted at middle of beak; body black, coarsely punctate; larger, 3.3—3.8 mm. 45. ATER.
aa. Antennæ inserted near base of beak; body brownish-yellow or fuscous black, finely punctate; smaller, not over 2.5 mm.
  b. Pubescence longer, coarse, yellowish, forming a distinct pattern on elytra; body uniform brownish-yellow. 46. CASSANDRÆ.
  bb. Pubescence short, white, very fine, irregularly distributed; color usually fuscous black. 47. ALBOVESTITA.

45 (8201). AULETES ATER Lec., 1876, 4.

Oblong-oval. Black, thinly clothed with fine gray pubescence; antennæ and legs piceous. Beak longer than head and thorax, nearly straight, coarsely punctured; head coarsely and densely punctured. Thorax as long as wide, slightly narrowed in front, feebly rounded on sides, coarsely and densely punctured. Elytra twice as wide as thorax, very convex, deeply, very irregularly and coarsely punctate. Length. 3.3—3.8 mm.

Ramapo Mts., Fort Lee, Milltown and Bear Swamp, N. J., May 27—July 27. Staten Island, N. Y. Occurs on sweet fern, *Comptonia peregrina* L. and bayberry, *Myrica*. Ranges from New England, Toronto, Can., Illinois, Michigan and Missouri, south to Maryland.

46 (8204). AULETES CASSANDRÆ Lec., 1876, 5.

Oblong-oval, robust. Brownish-yellow, thinly clothed with rather long, coarse yellowish pubescence, more dense on head, on median line and in a band near apex of thorax, and in two irregular cross-bands on elytra, one median, the other at apical fourth, the former prolonged along the suture to base. Beak longer than head and thorax, somewhat stouter and more flattened than in the next species, finely and sparsely punctate, the antennæ inserted at basal third. Thorax slightly broader than long, sides

feebly curved, disc more constricted near apex, finely and densely punctate. Elytra at base one-third wider than thorax, coarsely and densely punctate, the rows of punctures more irregular than in the next. Length 1.8—2.2 mm.

Ormond, Enterprise and Dunedin, Fla., Feb. 17—Dec. 3. Beaten from foliage of the red-bay in winter and swept from the flowers of huckleberry in spring. Easily distinguished from *albovestita* by the longer, more dense and coarser yellowish pubescence and stouter beak with antennæ inserted farther from base. The type in the LeConte collection is from Capron, Fla. Specimens in the Horn collection at Philadelphia are from Georgia, and it is doubtful if it occurs north of the Gulf and South Atlantic States, the northern records under the name being based on specimens of *albovestita*.

47 (——). AULETES ALBOVESTITA sp. nov.

Pale reddish-brown to fuscous, very thinly and irregularly clothed with fine whitish hairs. Antennæ inserted at basal fourth or fifth of beak, the latter slender, subcylindrical, as long as head and thorax, alutaceous, rather coarsely and sparsely punctate. Thorax subcylindrical, slightly longer than wide, sides feebly rounded, disc densely and finely punctured. Elytra one-half wider than thorax, coarsely punctate, the punctures in nearly regular rows. Length, 2 mm. (*W. S. B.*)

Tyngsboro, Freetown and Dighton, Mass., May 28—Sept. 13. Orange Mts., Anglesea and Brigantine Beach, N. J., April—August on bayberry, *Myrica cerifera* L. Occurs also on the foliage of leather-leaf, *Chamædaphne calyculata* L., a low Ericad shrub, probably throughout the Transition Life Zone. Ranges from New England to Lake Superior, south to North Carolina. The majority of the New England specimens are uniform fuscous in hue. LeConte confused this species with *cassandræ*, his specimens from Detroit, Mich., belonging here.

II. EUGNAMPTUS Schönh., 1839. (Gr., "easily flexible.")

Slender-bodied Rhynchitids, sparsely clothed with erect bristly hairs and having long slender legs. The males have the beak shorter, the eyes usually larger and closer together and the mandibles with but one tooth on the outer side, those of female being externally two-toothed. Eight species and five color varieties are recognized by Pierce from the United States. Of these five species and three color varieties occur east of the Mississippi River.

KEY TO EASTERN SPECIES OF EUGNAMPTUS.

a. Elytral intervals very narrow, convex, not wider than the striæ; punctures of striæ large, quadrate, crowded; black or piceous, head and thorax reddish-yellow. 48. STRIATUS.

aa. Elytral intervals flat, or nearly so, wider than striæ; punctures of striæ smaller, rounded; color variable.

b. Color usually uniform brownish-yellow; eyes of male not much larger than those of female; head strongly punctured. 49. PUNCTICEPS.

bb. Color not as above; eyes of male distinctly larger than those of female and much closer together; head finely and more sparsely punctured.

c. Front of head not sulcate; abdomen black.

d. Elytra bluish-black; head behind the eyes cylindrical, not narrowed; legs and thorax variable in color. 50. COLLARIS.

dd. Elytra dark reddish-brown or piceous; head narrowed behind eyes; legs always pale, thorax reddish-yellow. 51. ANGUSTATUS.

cc. Front with short median sulcus or channel; abdomen in part or wholly reddish-yellow. 52. SULCIFRONS.

48 (8205). EUGNAMPTUS STRIATUS Lec., 1876, 5.

Elongate, slender. Black, clothed with erect black hairs, head and thorax reddish-yellow. Beak black, coarsely punctured, distinctly carinate behind the antennæ, which are inserted about the middle and are long and slender; front sparsely punctured, foveate in male, obsoletely channeled in female. Thorax longer than wide, sparsely and coarsely punctate; median dorsal line deep, abbreviated at each end. Elytral striæ marked with deep, transverse, close-set punctures; intervals narrow, each with a row of minute, distant punctures. Length 4.5—4.7 mm.

Not recorded outside of Florida. Described from Haulover. Taken at Ormond, Key West and Dunedin. March 18—April 14. Beaten from scrub oak.

49 (8208). EUGNAMPTUS PUNCTICEPS Lec., 1876, 6.

Brownish-yellow, elytra rarely in part piceous. Head not narrowed behind, coarsely, not densely punctured; beak rather slender, not striate, coarsely and sparsely punctate; antennæ stouter than in our other species. Thorax subcylindrical, longer than wide, narrowed in front, widest at middle; disc coarsely and rather closely punctured, feebly channeled. Punctures of elytral striæ small, round, close-set; intervals flat, each with a row of very fine, distant punctures. Length 2.7—4 mm.

Described from Illinois and Georgia. Known also from Maryland to Florida, Kansas, Texas and Nebraska. Clayton, Ga., in July. At Plummer's Island, Md., it occurs only on the dwarf sumac, *Rhus copallina* L. The head is narrower and beak more slender than in *collaris*.

50 (8207). EUGNAMPTUS COLLARIS Fab., 1801, II, 410.

Color variable as shown below; elytra blue-black, abdomen black. Beak carinate at base in male, sparsely and coarsely punctate. Thorax as wide as long, widest at middle; disc coarsely, rather sparsely and irregularly punctate and with a shallow median depression on basal half. Elytra not distinctly striate but the intervals each with a fine carina near the row of large punctures and also with a row of much finer more distant seta-bearing punctures external to the large ones. Length 3.5—4.7 mm.

Frequent throughout Indiana; May 21—July 13. Beaten from oak, walnut, butternut and hickory and swept from low herbage along roadsides and the borders of woods. On hickory in June and July near New York City. Ranges from New England to Michigan and Iowa, south to Florida and Texas.

Four color varieties are recognized by Pierce, three of which have been taken in Indiana. The fourth, *ruficeps*, seems to be confined to Texas and to deserve specific rank.

KEY TO COLOR VARIETIES OF E. COLLARIS FAB.

a. Thorax black.

b. Entirely black except elytra; head often with reddish frontal spot; usually female. 50-a. NIGRIPES Melsh.

bb. Body black, elytra bluish-black, legs reddish-yellow; both sexes included. 50-b. FUSCIPES Pierce.

aa. Thorax reddish-yellow.

c. Head black with reddish frontal spot; elytra bluish-black; legs piceous or reddish-yellow; usually female. 50-c. COLLARIS Fab.

cc. Head, legs and antennæ reddish-yellow; elytra bluish-black; both sexes included. 50-d. RUFICEPS Pierce.

51 (8206). EUGNAMPTUS ANGUSTATUS Hbst., 1797, 140.

Head, thorax, prosternum and legs usually yellow, elytra dark brown or piceous, antennæ piceous. Head and beak rather finely and sparsely punctate. Thorax semi-cylindrical, about as wide as long, disc finely and sparsely punctate and with a short median impressed line. Elytra sculptured as in *collaris*. Length 3.7—4.2 mm.

Lake, Starke, Kosciusko and Marion counties, Indiana, scarce; June 7—July 4. Toronto, Ontario. Abundant near New York City in May, June and July, on hickory leaves. Range more northern than that of *collaris*. The status of this species is as yet uncertain. LeConte (1876, 6) states that *collaris* "may be a dimorphic form of *angustatus*;" if so the former name has priority. It is possible that *angustatus* is the male of *collaris*, with the piceous color of elytra a characteristic of northern specimens.

52 (8209). EUGNAMPTUS SULCIFRONS Gyll., Schönh., 1839, 343.

Elongate, slender. Head, thorax, legs and in part the under surface reddish-yellow, elytra bluish-black, antennæ piceous. Beak a little shorter than head, the latter narrowed behind the eyes, sparsely punctate. Thorax subcylindrical, slightly longer than wide; disc rather coarsely and sparsely punctured. Elytra one-half wider at base than thorax, the punctures of striæ large; intervals narrow, feebly convex. Length 3.5—4.5 mm.

Marshall Co., Ind., rare; June 11—12. Beaten from oak. Described from Carolina and known from Alexandria, Va., south and southwest to Texas and Kansas. The Indiana specimens were determined by Pierce. He has recorded (1913, 369) the species as "distinctly southern and differing structurally only by the frontal sulcus," yet in his key to species he states that *augustatus* has the front sulcate and that both species have the thorax medially depressed. This does not agree with Gyllenhal's original description of *sulcifrons*, wherein he states: "*Eugnampto augustato* valde similis, sed frons sulcata, thorax non canaliculatus."

III. RHYNCHITES Schneider, 1791. (Gr., "snout.")

The members of this genus are more convex and robust and are easily distinguished by the exposed pygidium. About 16 species are known from the United States, seven of which occur in our territory.

KEY TO EASTERN SPECIES OF RHYNCHITES.*

a. Surface distinctly pubescent; length 3.5 or more mm.
b. Pubescence short, inconspicuous; body red above. 53. BICOLOR.
bb. Pubescence long, erect, conspicuous.
c. Strial punctures distant, not very distinct; color blackish-bronzed, elytra often paler. 54. ÆNEUS.
cc. Strial punctures large, deep; color blue-black. 55. HIRTUS.
aa. Surface glabrous or almost so; length less than 3 mm.
d. Head strongly punctured; blue-bronzed; form more elongate; length 2.5—2.8 mm. 56. CYANELLUS.
dd. Head feebly punctured; form more robust; length less than 2.5 mm.
e. Color above strongly coppery; beak in both sexes as long as thorax; sub-basal elytral depression very distinct. 57. ÆRATUS.
ee. Color above black or bluish-black, at most feebly brassy; elytral depression feeble.
f. Beak of male shorter than thorax; of female one-fourth longer, very slightly widened and flattened near apex. 58. PERPLEXUS.
ff. Beak of both sexes as long as head and thorax, distinctly widened and flattened near tip. 59. ELUSUS.

**R. fossifrons* Lec., cited in Smith's List of N. J. Ins., is omitted. This name was assigned to a single specimen from Mariposa, Cal., which "may have been an extreme variation" (Pierce, 1909, 339); and there is no possibility of its being properly applied to a New Jersey insect.

53 (8210). RHYNCHITES BICOLOR Fab.,* 1798, I, 388.

Robust, convex, pyriform. Elytra, thorax and head behind eyes, bright red; under surface, femora and beak black; tibiæ, tarsi and antennæ piceous-black. Beak as long as head and thorax, rather sparsely marked with elongate punctures; antennæ inserted at its middle, their grooves distinct. Thorax cylindrical, as long as wide, rather densely and finely punctate. Elytral striæ indistinct, their punctures but little coarser than those of intervals, which are very dense. Beak of female shorter and stouter than in male. Length 5—6.5 mm. (Fig. 32.)

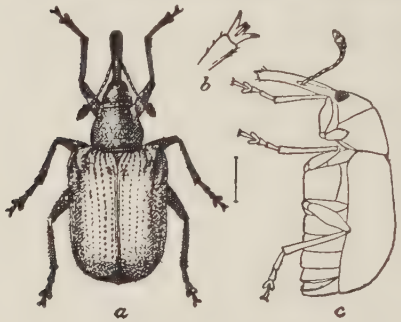

Fig. 32. *a*, Female; *b*, claw; *c*, side view of female. (After Chittenden.)

Kosciusko and Marion counties, Indiana, scarce; June 2—July 5. Occurs on the blossoms and foliage of cultivated and wild roses, probably throughout the northern half of the State. Common near New York City on roses, June 13—August, the larvæ in the hips. Ranges from the Atlantic to the Pacific, but principally northward in the Transition Life Zone. Known as the "rose curculio" and recorded by Chittenden (1901, 98) as occasionally doing much damage to cultivated roses, especially *Rosa rugosa* hedges, by puncturing the flower buds, and also to ripe blackberries and raspberries by puncturing the fruit with its beak and causing it to decay. Remedies, hand picking and jarring into vessels. When the insects occur on other plants than canes bearing berries or on roses soon to blossom, spray with paris green at the rate of a pound to 150 gallons of water.

54 (8211). RHYNCHITES ÆNEUS Boh., 1829, 22.

Form of *bicolor*. Either wholly black with a slight bronzed tinge, or with the elytra a dull brownish-yellow. Beak slender, longer than head and thorax, sparsely and coarsely punctate in front of antennæ, which are inserted slightly behind the middle; front of head striate, coarsely and shallowly punctate. Thorax short, bell-shaped, finely and rather densely punctate. Punctures of elytral striæ fine, less distinct than those of the intervals, which are in irregular rows. Length 5—6.5 mm.

Lake, Lawrence and Posey counties, Indiana, scarce; June 3—July 14. Bear Swamp, N. J., July 23. Fort Montgomery, N. Y., July 26. Ranges from New York, Wisconsin and Michigan

*Sharp (1889) founded a new genus, *Merhynchites*, for this and an European species, based upon the presence in them of a minute centrosternal piece of the prosternum which "separates the apices of the procpimera," this being absent in our other Rhynchites. We prefer to retain the species under the older name.

south to Florida and northwest to Manitoba and Oregon. Recorded by Pierce as occurring on wild sunflower, artichoke and *Psoralea multiflora.*

55 (8215). Rhynchites hirtus Fab., 1801, II, 421.

Oblong, elytra subdepressed. Blue-black above, black beneath. Beak slender, as long as head and thorax, coarsely and sparsely punctate, carinate at base. Thorax short, subcylindrical, widest at middle, rather sparsely and coarsely punctate. Elytra two-thirds wider than thorax, the rows of punctures, coarse, distinct; intervals each with a single row of fine distant punctures. Length 4 mm.

Posey Co., Indiana, rare; April 26. Fall River, Mass., June 11. Staten Island, N. Y., not common on black-jack oak (*Quercus marylandica* Muench.); May 25. Ormond and Sanford, Fla., March 20—April 19. Occurs on rosin-weed (*Silphium integrifolium* Michx.), cutting the stems.* Ranges from New England to Michigan south to Florida, where it is much more common than in Indiana.

56 (8221). Rhynchites cyanellus Lec., 1876, 8.

Elongate-oblong, convex. Above bluish-green slightly tinged with bronze; under surface, legs and antennæ black. Beak slender, longer than thorax, female; one-fourth shorter, male; coarsely and densely reticulately punctate; antennæ inserted near basal third; front coarsely punctured, without fovea. Thorax short, subcylindrical, not narrowed in front, coarsely and densely punctate. Elytra one-third wider than thorax, feebly impressed behind the scutellum, the striæ formed of rows of close-set, deep punctures which are much wider than the intervals. Length 2.4—2.7 mm.

Lake and Martin counties, Indiana, scarce; June 21—July 11. Taken by sweeping. Reported abundant at Highlands, N. J., by Chittenden. Wales, Maine, Oct. 18. Fulton County, N. Y., May 18. Described from Massachusetts and Illinois, and known from Newfoundland, Ottawa and Toronto, Canada, and New England to Colorado. Occurs on willow leaves, sometimes abundantly.

57 (8222). Rhynchites æratus Say, 1831, 5; ibid, I, 263.

Oblong, convex. Above coppery, clothed with very fine, sparse, prostrate hairs; brassy black beneath; antennæ and tarsi piceous. Beak slender, a little shorter than head and thorax, both it and front alutaceous and finely and sparsely punctate. Thorax subcylindrical, slightly longer than wide, sides feebly rounded, disc densely and coarsely punctate. Elytra one-half wider than thorax, sub-basal transverse impression very distinct when viewed from the side; strial punctures large, transverse; intervals narrow. Length 2—2.3 mm.

*Forbes, Fifth Ill. Rep., 75.

Perry Co., Indiana, rare; May 21. Beaten from oak. New Jersey, "not rare on oak, May—July, but local." Ranges from Ontario and New England south to Florida and west to Missouri and Nebraska. Packard records it as attacking the foliage of willow in June at Brunswick, Maine.

58 (——). Rhynchites perplexus Blatch., 1916, 95.

Oblong, subconvex. Above bluish-black, feebly brassy; antennæ, tibiæ and tarsi piceous; under surface and femora black; pubescence very fine, sparse, prostrate. Beak slightly shorter than thorax, male; one-fourth longer, female; slightly widened and sculptured with coarse, elongate punctures in front of antennæ; front bluish, strongly alutaceous, finely and sparsely punctate. Thorax subcylindrical, as wide at middle as long, slightly narrowed in front and near base, densely and rather finely punctate, the punctures more or less confluent. Elytra at base one-half wider than thorax, sides subparallel for four-fifths their length, then broadly rounded to apex; disc feebly but distinctly depressed on basal third; strial punctures coarse, rounded, wider than intervals. Pygidium sculptured like front; side pieces of meso- and metasterna coarsely, rather closely punctate; abdomen finely, very sparsely punctate. Length 1.6—1.8 mm.

Crawford Co., Indiana, June 24. Swept from low herbage. Okefinokee Swamp, Ga., June. New Jersey, District of Columbia (Leng coll.) LeConte Collection, Mass. Easily distinguished from *æratus* by its color, shorter beak of male and more feeble elytral depression. Resembles *cyanellus* but smaller, darker, beak much shorter and head much more finely punctured. The eyes of the male are round and somewhat larger than the elliptical, more finely facetted ones of female.

59 (——). Rhynchites elusus Blatch., 1916, 96.

Oblong-oval. Black, feebly tinged with bronze; antennæ and legs piceous, pubescence gray, very fine and sparse. Beak of both sexes as long as head and thorax, much more finely sculptured than in *perplexus;* front bronzed, very finely alutaceous, minutely and very sparsely punctate. Thorax shorter and wider than in the two preceding, widest at basal third, its disc finely, deeply and very densely punctate, the punctures not confluent. Elytra at base one-half wider than thorax, sides parallel for half their length, then broadly curved to the rounded apex; disc widely and shallowly depressed at basal third; strial punctures smaller, rounded, close-set. Abdomen alutaceous, finely and sparsely punctate. Length 1.8—2 mm.

Dunedin, Florida, March 24—April 13. Seven specimens swept from huckleberry blossoms. The much longer and apically wider beak, more finely sculptured front and broader thorax and elytra separate this readily from both *æratus* and *perplexus*.

Subfamily III. ATTELABINÆ.

The Leaf-rolling Weevils.

This subfamily comprises a small group of usually glabrous short-bodied, robust species differing from the Rhynchitids mainly in the form of the mandibles, which are stout, pincer-shaped and toothed on the inner side; in having the tibiæ armed at tips with two strong hooks instead of small terminal spurs, and in the tarsal claws being united or connate at base instead of free and bifid.

In addition to the distinctive characters mentioned they have the head prominent, not deflexed; beak short, stout, wider at the outer end; antennæ inserted in short broad grooves on its upper surface rather than on the sides, straight, 11-jointed, first and second joints stouter, 9—11 larger and forming a loose elongate club. Thorax truncate before and behind, convex. Elytra separately rounded at tip, not covering the pygidium, which is corneous and has its upper surface margined with a large deep groove; epipleuræ narrow but distinct. Abdomen with five short ventral segments separated by straight sutures. Front coxæ conical, prominent, contiguous; middle ones slightly transverse; hind ones more transverse, nearly contiguous, the intercoxal process acute. Legs stout; tibiæ serrate on inner side; tarsi dilated, brush-like beneath, third joint deeply bilobed.

This subfamily represents the family Attelabidæ founded by Kirby in 1837 upon the genus *Attelabus* of Linnæus. It comprises only about 200 species most of which inhabit the tropics, reaching Madagascar. Only five species belonging to the one genus (Fig. 33) are known from the United States, four of which occur in our territory. As their common name indicates, they live during the larval stage in compact thimble-shaped rolls made from leaves (Fig. 34). These rolls are formed by the female beetle and are often found hanging by a narrow strip to the leaf from which they were made. In each roll a single egg is laid. The larva, after hatching, feeds upon the inner part of the roll, and when mature enters the ground to pupate.

I. Attelabus Linn., 1767. (Gr., "a kind of locust without wings.")

Since this is the only genus of the subfamily it is sufficiently characterized above. The only known North American species not occurring in our territory is *A. genalis* Lec., described from New Mexico.

KEY TO EASTERN SPECIES OF ATTELABUS.

a. Surface glabrous; color above either mainly bright red or black.
b. Elytra bright red (except in variety *similis*).
c. Front femora slender, not toothed in male; meso- and metasterna black. 60. ANALIS.
cc. Front femora stout, toothed in male; under surface red. 61. NIGRIPES.
bb. Elytra black with two reddish spots. 62. BIPUSTULATUS.
aa. Surface pubescent; elytra dull red (rarely blackish in the melanic northern form). 63. RHOIS.

60 (8224). ATTELABUS ANALIS Illig., 1805, 616.

Fig. 33. (After Lugger.)

Robust, pyriform. Elytra, thorax, base of head, prosternum and abdomen bright red; remainder of body, including appendages, blue-black. Beak stout, shorter than head, narrowed near middle at insertion of antennæ, sparsely and finely punctate. Head with two grooves between the eyes, coarsely and closely punctate. Thorax bell-shaped, much narrowed in front, sparsely and finely punctured. Elytra with rows of feebly impressed moderate sized punctures. Side pieces of meso- and metasterna coarsely punctate. Ventral segments of male with two rows of minute tubercles. Length 5—6 mm.

Frequent throughout Indiana, more so in northern portion; May 25—July 8. Occurs mostly on the leaves or beneath the bark of young hickory; also on oak and walnut. Abundant near New York City, May —Sept., rolling the leaves of oak. Numerous localities in Florida, Feb. 19—April 9. Ranges from New England and Ontario to Michigan, south to Florida and Texas. Sometimes confused with *Rhynchites bicolor* which it resembles in color; apart from structural characters *analis* may be known by the absence of hair on the surface; the hair is not conspicuous in *bicolor* but easily seen when looked for. Florida specimens are mostly much smaller than those from Indiana. *A. similis* Kirby is a variety, which is darker in color with the elytra less shining, described from Canada, and found by Wm. T. Davis at Rock City, N. Y., in June.

61 (8225). ATTELABUS NIGRIPES Lec., J. E., 1824, 171.

Form of *analis*, but usually smaller. Color above similar, the pygidium often fuscous; under surface usually dull red; beak and legs black without the bluish tinge of those of *analis*. Thorax less narrowed in front, more finely punctate. Elytra shorter, proportionally broader and with rows of coarser punctures. Front femora shorter, much thicker, and bidentate in males. Length 3.5—4.5 mm.

Southern half of Indiana; scarce. May 12—June 23. Beaten from hickory. Abundant near New York City, May to Septem-

ber, rolling leaves of sumac. Described from Georgia and reported from Florida. Ranges from Massachusetts to Kansas and Colorado. Sumac is probably the only food plant, its occurrence on other foliage being accidental. LeConte, in his original description, states that the breast of *nigripes* is black and its length 3 lines (6 mm.). The species herewith described as *nigripes* differs in these characters, but it is the one known under that name in most collections.

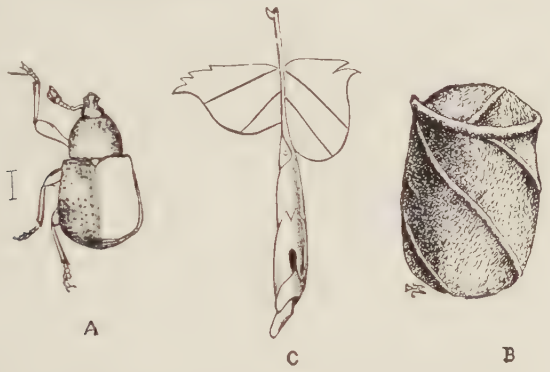

Fig. 34. A, *Attelabus bipustulatus* Fab.; B, alder leaf rolled by *Attelabus rhois* Boh. × 2; C, birch leaf rolled by *Rhynchites betulæ*, a British species. (After Packard & Sharp.)

62 (8226). ATTELABUS BIPUSTULATUS Fab., 1801, II, 418.

Short, robust, pyriform. Black with a faint bluish tinge; elytra each with an oblong red spot on humerus. Beak shorter than head, densely reticulately punctured in front of antennæ; head sulcate between the eyes, sparsely and very finely punctate. Thorax bell-shaped, finely and sparsely punctate. Elytra with rows of small, feebly impressed punctures. Front thighs short, very stout in male, armed with a small acute tooth in both sexes. Length 3—4 mm. (Fig. 34.)

Frequent throughout Indiana, May 6—July 25. Beaten from oak, hickory and walnut. Lakehurst, N. J., May to July, rolling the leaves of oak; Stamford, Conn., July; Bloomsburg, Pa., September 13. Ranges from Ontario and Massachusetts to Wisconsin south and west to Missouri, Florida and Texas. Said by Packard to infest especially the leaves of the red, post and laurel oaks (*Quercus rubra* L., *Q. minor* Marsh and *Q. imbricaria* Michx.). The eggs, which were deposited in late April, hatched by May 15, fed on the dry substance of their nest, pupated within the nest near the end of May, and the first beetles issued June 2, a second brood of larvæ appearing in early July.

63 (8228). ATTELABUS RHOIS Boh., 1829, 21.

Robust, pyriform. Uniform dull red*, rather thickly clothed with short, prostrate yellowish pubescence. Beak short, roughly and coarsely punctate in front of antennæ; head carinate between the eyes. Thorax short, about as wide as long, feebly narrowed in front; disc coarsely and densely punctate and with a narrow median impressed line which extends forward on the occiput. Elytra very roughly sculptured with rows of coarse punctures; intervals narrow, marked with finer punctures. Length 4.5—5.5 mm.

Lake, Starke, Marshall and Vigo counties, Indiana, scarce; June 15—30. Occurs on hazelnut, alder and rose-mallow. Not rare near New York City, on hazel, *Corylus americana* Walt., rolling leaves, May—July. Ranges from New England and Nova Scotia west and southwest to Nebraska and Arizona. According to Packard (1890, 632), the singular, thimble-like rolls of this weevil may be found in June and July on the alder. When about to lay her eggs, the female begins to eat a slit near the base of the leaf on each side of the midrib, and at right angles to it, so that the leaf may be folded together. Before beginning to roll up the leaf she gnaws the stem nearly off, so that after the roll is made, and has dried for perhaps a day, it is easily detached by the wind and falls to the ground. When folding the leaf, she tightly rolls it up, neatly tucking in the ends, until a compact, cylindrical solid mass of vegetation is formed. Before the leaf is entirely rolled she deposits a single egg, rarely two, in the middle next to the midrib, where it lies loosely in a little cavity. These rolls remain on the bushes sometimes for several days, but probably drop by the time the larva escapes from the egg, and it seems probable that the grub uses the roll for a shelter until it matures and is ready to enter on its transformation to a beetle."

Subfamily IV. PTEROCOLINÆ.

THE SHORT-WINGED WEEVILS.

The single species representing this subfamily in the eastern United States differs from those of the two preceding subfamilies not only in having the thorax acutely margined and excavated beneath as in some Histerids, but also in having a shorter and more rounded form, in the antennæ being inserted much nearer the eyes, and in having the elytra shorter, separately rounded and widely separated at tips, thus exposing not

*An Adirondack specimen in Davis' collection is black except abdomen, tibiæ and tarsi; and a melanic form occurs at Mt. Washington, N. H., in August. (*Frost.*)

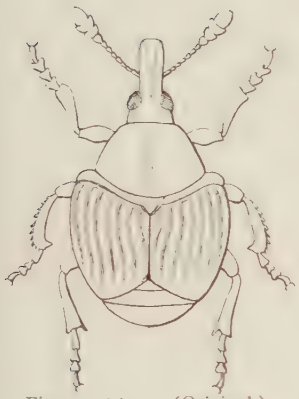

Fig. 35, × 12. (Original.)

only the pygidium but two additional dorsal segments, all three of which are corneous and densely punctured. They differ also in having both front and middle coxæ small, rounded and widely separated.

I. PTEROCOLUS Schön., 1826.
(Gr., "wing" + "truncate.")

64 (8223). PTEROCOLUS OVATUS Fab., 1801, 426.

Short, rounded, very robust. Bright indigo blue; antennæ, beak and legs darker. Beak much shorter than thorax, striate, finely punctate. Thorax one-half wider than long, sides feebly converging from base to apex, disc finely and densely marked with elongate oval punctures. Elytra subdepressed and sculptured with wide, shallow striæ which are coarsely and irregularly punctate. Length 2.8—3.2 mm.

Lake, Starke and Marshall counties, Indiana, scarce; probably throughout the State; June 11—30. Bear Swamp and Lakehurst, N. J.; June 16—July 27. Yaphank, N. Y., May 28, on scrub oak. Stoneham, Mass., on new sprouts of oak. Dunedin, Eustis, Sanford and Ormond, Fla., frequent; March 19—April 11. Ranges from New England to Iowa and Missouri, south to Florida. Recorded as occurring on oak, plum, peach and wild grape.

Subfamily V. APIONINÆ.

Small pear-shaped Rhynchophora having the mentum linear, much longer than wide, inserted upon a short gular peduncle; mandibles 3-toothed, the middle tooth curved, acute, forming the apex; antennæ straight, not elbowed, inserted in foveæ at the sides of beak, 11-jointed, joints 1 and 2 stouter than the others, the first longer than second, 9—11 broader and longer, forming an oval, pubescent pointed club; eyes rounded or elliptical, convex; thorax truncate in front, subsinuate behind, usually gradually narrowed from base to tip; elytra usually deeply striate, inner wings large; prosternum very short, its sutures distinct; mesosternum small, narrow between the coxæ; metasternum slightly longer than the first ventral; first and second ventral segments large, closely united, third and fourth very short; front coxæ conical, prominent, contiguous, middle ones round, narrowly separated, hind ones small, transverse, widely sepa-

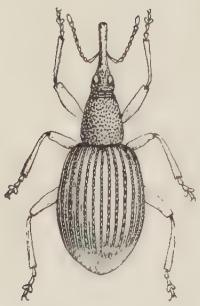

Fig. 36. *Apion assimile*, a European species greatly enlarged. (After Chittenden.)

rated; femora more or less club-shaped, separated from the coxæ by the large intervening trochanters (Fig 14), front tibiæ longer than the others; tarsi usually feebly dilated, claws variable. Two genera represent the subfamily in the United States. The principal papers treating of the species of our fauna are as follows:

Smith, John B.—"Synopsis of the Apioninæ of North America," in Trans. Am. Ent. Soc., XI, 1884, 41—68.

Fall, H. C.—"Revision of the Species of Apion of America north of Mexico," in Trans. Am. Ent. Soc., XXV, 1898, 105—184.

KEY TO GENERA OF APIONINÆ.

a. Front femora never distinctly stouter than the others; antennal club larger, its last joint longer than the one preceding. I. APION.

aa. Front femora distinctly stouter than the others; antennal club relatively very small, its last joint much shorter than either of the two preceding. (Fig. 39, *f.*) II. PODAPION.

I. APION Herbst, 1797. (Gr., "a pear.")

To this genus, as characterized above, belong all but one of the 110 or more species of the subfamily known from this country. They form a group remarkable for their general small size and uniformity of color, shape and structure. The larvæ feed, for the most part, on seeds, principally those of legumes, though some form galls on the stems and leaves of plants, others knots on the roots, while a few bore into the pith and form a kind of cocoon of the gnawed particles. The sexes of most species are readily distinguished, the tip of the abdomen being visibly deflected in the male and more or less retracted in the female. The males have also a small additional terminal dorsal segment which is usually exposed, and their beaks are usually shorter and more coarsely sculptured than those of female. The sexes of some species, however are very difficult to separate.

As here restricted to the tribe Apionini of Wagner, 1910, *Cylas* being included in Brenthidæ, this subfamily includes about 1,000 species, found in all parts of the world, of which about 54 species have been recorded from east of the Mississippi River. On account of their small size and uniformity of general appearance they are very difficult to classify. We have mainly followed

Fall in the tables given for their separation but have added other characters to the keys wherever it was thought that it would aid the student. He first separates the species of the United States into four groups, all of which are represented with us.

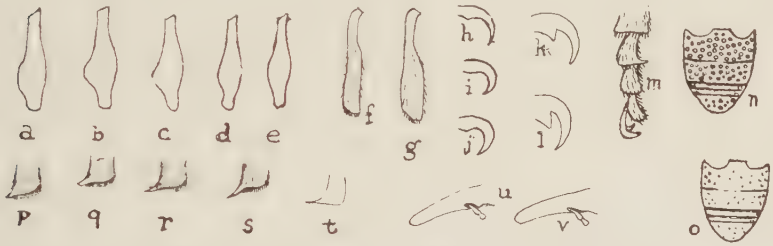

Fig. 37. Characters of Apion. *a*, Front femur of male of *impeditum*; *b*, of *impunctistriatum*; *c*, of *melanarium*; *d*, of *desolatum*; *e*, of *pennsylvanicum*; *f*, front tibia of male, usual form in Group I; *g*, same of *finitimum*; *h*, *i*, *j*, types of simple claws of Groups I and II; *k*, *l*, types of toothed claws in Groups III and IV; *m*, middle tarsus of *tenuiforme*; *n*, abdomen closely, coarsely punctate; *o*, abdomen sparsely, finely punctate; *p-s*, mucronate hind tibiæ of males of *percicar*, *patruele*, *welshii*, and *novellum*; *t*, first joint of middle tarsi of male of *persimile*; *u*, upper margin of antennal fovea angulate; *v*, same not angulate. (After Fall.)

KEY TO GROUPS OF APION.

a. Tarsal claws simple or nearly so, (Fig. 37, *h*, *i*, *j*,); pubescence almost wanting.

b. Front femora of male more or less swollen or tuberculate and with a polished area toward the tip. (Fig. 37, *a.*—*e.*) GROUP I.

bb. Front femora of male unmodified. GROUP II.

aa. Tarsal claws evidently toothed near the base (Fig. 37, *k*, *l.*); pubescence usually plainly visible.

c. Tibiæ of male, at least two pairs of them mucronate at tip. (Fig. 37, *p*, *q*, *r*, *s.*) GROUP III.

cc. Tibiæ of male unarmed at tip. GROUP IV.

GROUP I.

Our members of this group have the form generally slender, the pubescence very sparse or nearly wanting, the surface very shining. The males are distinguished by having the beak shorter, dilated at the base and more strongly sculptured than in the female. The male front femora are more or less swollen or tuberculate on the inner face near the tip, the lower face of the swelling being always polished: the femur is also usually grooved lengthwise near the tip, the groove being limited on the outside by a more or less well defined ridge, known as the infra-limiting ridge. The front tibiæ are rather suddenly though not strongly widened at about the basal fourth, while the tips of the middle and hind tibiæ are armed with a small spine.

KEY TO EASTERN SPECIES OF GROUP I.*

a. Front femora of male with a conspicuous tubercle near tip. (Fig. 37, *a*, *b*, *c*.)

b. Abdomen coarsely and closely punctate. (Fig. 37, *n*.)

c. Length 2 or more mm.

d. Thorax with base and apex subequal in width, its disc as wide as long.

e. Humeri evident; body more parallel, less convex; legs reddish-brown. 65. IMPEDITUM.

ee. Humeri absent; body more ovate, more convex; legs black. 66. QUADRICOLLE.

dd. Thorax with base evidently wider than apex, its sides rather prominent at middle; legs black. 67. IMPUNCTISTRIATUM.

cc. Smaller, length less than 2 mm.

f. Thorax longer than wide, densely punctate; surface bronzed, legs black. 68. CORACELLUM.

ff. Thorax slightly wider than long, sparsely punctate; legs and antennæ red. 69. ANCEPS.

bb. Abdomen much more finely and sparsely punctate. (Fig. 37, *o*.)

g. Thorax wider than long, its sides curved; body robust; eyes very large. 70. ATRIPES.

gg. Thorax as long or longer than wide; body more slender; eyes moderate.

h. Male with the polished area of front femora plainly striate, the front tibiæ strongly widened near apex. (Fig. 37, *g*.) 71. FINITIMUM.

hh. Polished area of front femora of male not or inconspicuously striate.

i. Humeri of elytra distinct.

j. Smaller, length not over 2.2 mm.

k. Black, shining, usually with a faint brassy lustre; infra-limiting ridge of front femur of male strong; legs piceous. 72. MELANARIUM.

kk. Black without brassy lustre; form more narrow; infra-limiting ridge feeble; legs rufous. 73. FLORIDANUM.*

jj. Larger and more robust, length 2.5 mm., less shining and without metallic lustre; infra-limiting ridge feeble or absent; legs black. 74. ROBUSTUM.

ii. Humeri of elytra wanting; legs piceous-brown or paler; length less than 2.5 mm. 75. OBSOLETUM.

aa. Front femora of male merely swollen, the tubercle absent. (Fig. 37, *d*, *e*.)

l. Size small, seldom exceeding 1.5 mm.

m. Legs reddish-brown; humeri wanting or very feeble; beak of male stout. 76. DESOLATUM.*

mm. Legs black or piceous; beak of male more slender.

n. Humeri wanting.

o. Beak sinuate toward base; intervals flat; abdomen nearly smooth. 77. SINUIROSTRUM.

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*Species marked thus * are so far known only from the South Atlantic coastal region.

oo. Beak as usual; intervals more or less convex; abdomen with coarse numerous punctures. 78. MOLESTUM.

nn. Humeri distinct; length 1.5—1.8 mm. 79. MINUTUM.*

ll. Larger, seldom less than 2 mm.; antennæ black; humeri distinct. 80. PENNSYLVANICUM.

65. (——). APION IMPEDITUM Fall, 1898, 113.

Very narrow, convex. Black, shining; pubescence very sparse. Beak rather strongly curved, sparsely but distinctly punctate, its apical portion strigose, subequal to head and thorax in male, one-fourth longer in female. Antennæ rather slender, the first joint equal to or slightly longer than the next two, the third more slender but about as long as second. Thorax closely not coarsely punctate, its dorsal line nearly complete. Elytra very narrow, sides parallel; intervals flat, not twice as wide as striæ. Length 2—2.3 mm.

Described from Peekskill, N. Y., and the District of Columbia. Very close to *erraticum* Smith.

66. (——). APION QUADRICOLLE Fall, 1898, 113.

Black, not very shining. Beak of female cylindrical, strongly curved, slightly longer than head and thorax. First antennal joint barely equal to the two following. Thorax quadrate, as wide as long, sides parallel, dorsal line nearly complete. Elytra strongly convex, sides evenly curved; intervals flat, twice as wide as striæ. Length 2 mm.

Described from Mississippi.

67. (8371). APION IMPUNCTISTRIATUM Smith, 1884, 48.

Elongate, rather slender. Black, shining, antennæ piceous; pubescence very short, scarcely visible. Beak finely strigose, minutely and sparsely punctate, not strongly curved; a little shorter than head and thorax, male; much longer and very slender, female. Antennæ slender, first joint equal to the next two, male, or three, female; the second reaching the eye. Thorax longer than wide, sides with an obtuse tubercle at middle; disc densely, rather coarsely punctate, its dorsal line complete. Elytra broadly oval, strongly convex, widest just behind the middle; intervals flat, twice as wide as striæ. Length 2—2.2 mm.

Steuben and Crawford counties, Indiana, scarce; probably throughout the State. May 13—June 25. Arlington, N. J., February—March. The punctures of elytral striæ are visible, notwithstanding the specific name. Readily known by its small size, slender form, obtuse tubercle at side of thorax and coarsely punctured abdomen. Ranges from Ontario and western Pennsylvania to Michigan and Texas. Breeds in the stems of *Heterotheca* and *Ambrosia* in Texas. (*Pierce.*)

68. (——). APION CORACELLUM Fall, 1898, 115.

Entirely black, more or less bronzed; pubescence fine and very sparse. Beak of male slightly shorter than head and thorax, stouter in basal third, nearly parallel and slender beyond the insertion of the an-

tennæ, shining in apical two-fifths, punctuation fine and sparse; of female much longer, very slender, not dilated, smoother. Thorax a little longer than wide, cylindrical, sides slightly prominent at middle, surface rather densely, not coarsely punctate, dorsal line nearly complete. Elytral humeri small but prominent, post-humeral sinuation well marked, intervals flat. Claws nearly simple. Length 1.6 mm.

Described from the District of Columbia. Resembles *minutum* but has the elytra longer and less ventricose, thorax more densely punctate, front femora of male more swollen.

69. (——). Apion anceps Fall, 1898, 115.

Black, legs and antennæ rufous; pubescence almost wanting. Beak of female subequal to head and thorax, slender, moderately curved, finely sculptured, scarcely punctate, tip smooth. First joint of antennæ about equal to the two following, third scarcely longer than fourth, second reaching the eye. Thorax widest slightly behind the middle, apical and basal constriction evident; disc with large, rather sparse, shallow punctures, its dorsal line nearly complete. Elytra narrow, humeri small but evident; striæ shallow with widely spaced punctures, intervals flat. Length 2 mm.

Described by Fall from a single female received by Blanchard from Illinois.

70. (8377). Apion atripes Smith, 1884, 49.

Short, very robust. Black, shining; pubescence scarcely visible. Beak of female slightly shorter than head and thorax, slender, cylindrical, rather strongly curved, finely strigose and finely and sparsely punctate. First antennal joint as long as the next two, third distinctly longer than fourth, second reaching the eye. Thorax slightly wider than long, widest at middle; disc coarsely and densely punctate, its dorsal line complete. Elytra short, broad, less than one-half longer than wide; striæ rather deep, their punctures elongate, well separated; intervals flat, twice as wide as striæ. Length 1.5—1.8 mm.

Lake county, Indiana, rare; July 30. Known heretofore from Virginia, Georgia and Florida. The short robust form, large eyes and wide thorax make it easily recognizable.

71. (——). Apion finitimum Fall, 1898, 116.

Elongate. Black, elytra faintly tinged with blue, legs sometimes piceous-brown. Beak of male very finely and sparsely punctate, polished on apical half, barely as long as head and thorax; of female, much longer, very slender, almost entirely polished. First joint of antennæ about equal to next two, male, or three, female, the third joint reaching the eye. Thorax as wide at middle as long, base a little wider than apex; disc rather finely and closely punctate, the median line nearly complete. Elytra not strongly widened at middle; intervals flat. Abdomen finely and rather sparsely punctate. Length 1.8—2 mm.

Described from Massachusetts, District of Columbia and Port Huron, Mich. The males have the femoral tubercle prominent and rounded and the front tibiæ strongly dilated.

72. (8379). APION MELANARIUM Gerst., 1854, 261.

Elongate, slender. Black, shining, elytra often with faint brassy lustre; antennæ and legs piceous; pubescence very sparse and inconspicuous. Beak of male scarcely longer than head and thorax, finely sculptured and punctulate; of female, longer and more curved, very slender. First joint of antennæ subequal to the next two, male; seldom as long as next three, female. Thorax longer than wide, sides feebly diverging from apex to base; disc rather finely, not very closely punctate, its dorsal line almost complete. Elytra narrow, nearly twice as long as wide; intervals nearly flat, about twice as wide as striæ. Under surface finely and sparsely punctate. Length 1.7—2.2 mm.

Not yet recognized from Indiana, though it undoubtedly occurs as it ranges from Canada and New England to Iowa, south to Florida and Texas, and is recorded from Michigan and Illinois. Arlington, N. J., April—October. Closely related to *pennsylvanicum* but the elytra more narrow and the front femora of male strongly tuberculate, not merely swollen as in that species.

73. (8374). APION FLORIDANUM Smith, 1884, 49.

Very narrow. Black, legs and antennæ dark rufous, pubescence very inconspicuous. Claws simple, femoral tubercle of male prominent, smooth area rather strongly striate inferiorly. Length 2 mm.

One male found at Capron, Fla. Nearest *desolatum* in general appearance, but differs by the evident humeri and stronger, striate femoral tubercle. The unusually stout beak and the very narrow elytra should make it easily recognizable.

74 (8365). APION ROBUSTUM Smith, 1884, 45.

Elongate, rather robust. Black, feebly shining; antennæ and tibiæ piceous; pubescence very fine and sparse. Beak of male as long as head and thorax, finely striate except at tip, minutely punctate; of female, longer, more slender and more strongly curved. First joint of antennæ equal to the two following, male, or three, female, the third joint reaching the eye. Thorax subcylindrical, a little longer than wide; disc finely, not densely punctate, the median line deep, complete. Elytra widest and more convex at middle; striæ rather fine, their punctures distinct; intervals flat, nearly three times as wide as striæ. Length 2.5—2.7 mm.

Southern third of Indiana, scarce. May 9—May 21. Swept from low herbage. Ranges from Michigan to Missouri and Texas. *A. obesum* Smith is the female of *robustum*.

75 (8363). APION OBSOLETUM Smith, 1884, 44.

Elongate, rather slender. Black, feebly shining, without metallic lustre; antennæ and legs piceous-brown. Beak of male as long as head and thorax, not strongly curved, sparsely and finely punctate; of female, longer and more slender. Thorax cylindrical, longer than wide, sides feebly curved; disc rather finely and closely punctate, the dorsal line entire. Elytra elongate-oval, nearly twice as long as wide; striæ rather deep, their punctures distinct; intervals feebly convex. Length 2.2—2.4 mm. (Fig. 39, *a*.)

Recorded from Michigan, Missouri, Dakota and Nebraska.

76 (8372). APION DESOLATUM Smith, 1884, 48.

Slender, very much elongated. Entirely black, legs rufous. Beak of male rather stout, shorter than head and thorax, nearly cylindrical, moderately dilated, strigose almost to apex, its punctuation sparse but evident; of female longer, slender, strongly arcuate, smoother and more shining. Thorax cylindrical, a little longer than wide, sides slightly curved at middle, surface rather sparsely, finely punctate, dorsal line feeble. Elytra ovate, striæ rather deep, intervals convex, tips prolonged in female. Claws nearly simple. Smooth area of male front femur not striate, limiting ridge evident. Abdomen sparsely, finely punctate. Length 1.6 mm.

Cape Sable, Florida. Described from Georgia.

77 (——). APION SINUIROSTRUM Fall, 1898, 121.

Elongate. Black, with or without æneous lustre; pubescence fine, sparse. Beak unique, in that, when viewed in profile, it appears flattened or even slightly concave at base, beginning at insertion of antennæ. Claws nearly simple, front thighs of male merely swollen, smooth area not noticeably striate. Length 1.7 mm.

Several examples from Lake Ashley, Florida.

78 (——). APION MOLESTUM Fall, 1898, 121.

Moderately elongate. Black, shining, antennæ brown, legs piceous. Beak of male shorter than head and thorax, dilated one-third from base, sparsely and finely punctate, polished and without punctures on apical third; of female, longer than head and thorax, the finer sculpture extending to the middle or beyond. First joint of antennæ equal to next two, male, a little longer, female. Eyes prominent. Thorax slightly longer than wide, apex nearly as wide as base; disc coarsely and closely punctate, the median line complete. Elytra widest at or a little beyond the middle; striæ deep, intervals feebly convex. Abdomen rather coarsely and closely punctate. Length 1.6 mm.

Marion, Dubois, Crawford and Perry counties, Indiana, scarce; May 13—June 19. Taken by sweeping roadside herbage and by beating oak. Described from Illinois.

79 (8380). APION MINUTUM Smith, 1884, 50.

Entirely black; pubescence indistinct. Beak of male as long as head and thorax, finely sculptured in basal half, thence polished to tip; of female,

a little longer, very slender. Thorax subcylindrical, slightly longer than wide, base a little wider than apex; disc sparsely punctate with nearly complete dorsal line. Elytra rather short, strongly convex, humeri small, sides distinctly diverging, widest at middle; intervals feebly convex. Female with tips of elytra produced. Length 1.5—1.8 mm.

Described from Georgia and Florida.

80 (8381). APION PENNSYLVANICUM Boh., Schön., 1839, 417.

Elongate, slender. Black, usually with a faint brassy lustre. Beak of male about as long as head and thorax, noticeably stouter at base than beyond the dilation; basal half finely and sparsely punctate, apical half polished; of female, longer and more slender. First joint of antennæ as long as the next two, male, or three, female, second joint reaching the eye. Thorax subcylindrical, slightly longer than wide, base a little wider than apex; disc rather coarsely and closely punctate, the median line complete or not. Elytra distinctly widening from base to middle, striæ well impressed; intervals feebly convex. Under surface finely and sparsely punctate. Length 2 mm.

Lake, Vermillion, Marion, Hamilton and Vigo counties, Indiana, scarce; April 21—August 25. Arlington, N. J. Ranges from Ontario and New England to Florida and westward to the Pacific. The larger size, darker antennæ, more distinct humeri and more finely and sparsely punctate ventral segments distinguish this from the preceding. *A. erythrocerum* Smith is a synonym.

GROUP II.

To this group belong those species having simple or nearly simple claws and whose males have the front femora unmodified. As in the preceding group, the pubescence is very sparse. Only three of the nine species included by Fall occur in our territory, and another is herewith described.

KEY TO EASTERN SPECIES OF GROUP II.

a. Legs and beak pale; antennæ inserted very near the base of beak. 81. PERMINUTUM.

aa. Legs and beak black; antennal insertion less basal.

b. Form stout; thorax widest behind middle, slightly constricted before base; pubescence of sparsely placed, scale-like hairs. 82. RECLUSUM.

bb. Form very slender, elongate.

c. Elytra black; pubescence present but sparse; middle femora of male swollen. 83. TENUIFORME.

cc. Elytra violaceous, pubescence wanting; basal half of thorax parallel. 84. PULCHRUM.

81 (8410). APION PERMINUTUM Smith, 1884, 59.

Elongate, depressed. Black; legs, antennæ, beak and tips of elytra yellowish or reddish brown; pubescence almost wanting. Beak shorter

than head and thorax, nearly straight, slender, cylindrical, finely striate only near base, not punctate. Antennæ short, first joint but slightly longer than second and reaching the eyes. Thorax wider than long, widest behind the middle, distinctly constricted near apex and base; disc rather coarsely, sparsely and unevenly punctate and with a rather large, shallow basal fovea. Elytra subparallel, striæ shallow; intervals rather wide, feebly convex. Under surface finely and sparsely punctate. Length 1.2—1.4 mm.

Ranges from Massachusetts south and southwest to Georgia, Florida and Texas, and should therefore be looked for in southern Indiana. Fall states that of 14 examples before him from widely different localities, he was unable to distinguish the sexes.

82 (——). APION RECLUSUM Fall, 1898, 126.

Ovate, robust. Black, feebly shining, legs piceous. Beak stout, as long as thorax, male, more slender and slightly longer, female; sparsely and finely punctate above, more closely on sides. First joint of antennæ subequal to the two following, second about reaching the eye. Front wide, punctate and deeply sulcate. Thorax large, wider than long; disc coarsely and rather closely punctate, its basal half with an impressed line. Elytra ovate, widest behind the middle; intervals wide, feebly convex. Under surface sparsely punctate; the side pieces of meso- and metathorax clothed with closely placed, white, scale-like hairs. Length 2.2 mm.

Known from New Jersey and District of Columbia, and may also occur in southern Indiana.

83 (——). APION TENUIFORME Fall, 1898, 129.

Very narrow. Black, sparsely pubescent. Beak about as long as head and thorax, not slender, rather strongly curved, scarcely dilated, finely sculptured nearly to the tip; punctuation sparse, fine, a little stronger at the sides. Thorax about as long as wide, widest a little before the base, sides parallel for a short distance at the apex, thence feebly arcuate to the base, which is a little wider than apex; surface sparsely punctate, a short impressed line at base. Claws simple. Male with middle femora stouter, first joint of middle tarsi with a strong spiniform process on the inner side. (Fig. 37, *m.*). Length 1.5 mm.

Described from Florida.

84 (——). APION PULCHRUM sp. nov.

Elongate, slender. Beak, thorax and elytra distinctly violaceous, antennæ and tarsi piceous; pubescence visible only on the legs. Beak stout, shorter than thorax, finely and sparsely punctate. Front finely tri-sulcate and punctate; eyes small. Thorax cylindrical, slightly longer than broad, feebly constricted near apex, sides parallel; disc minutely alutaceous, rather finely, not closely punctate and with a small, deep oblong fovea at base. Elytra nearly twice as long as wide, widest behind the middle; very deeply striate, the striæ with large punctures; intervals convex. Under surface very finely and indistinctly punctate, except on last three ventrals where the punctures are more evident. Length 2 mm. (*W. S. B.*)

One specimen from Kosciusko county, Indiana; June 9. Close to *punctinasum* Smith from the Northwest, but differs in color, in the almost total absence of pubescence, in the deep elytral striæ with their strong punctuation and in the very fine, almost obsolete punctuation of the first and second ventrals.

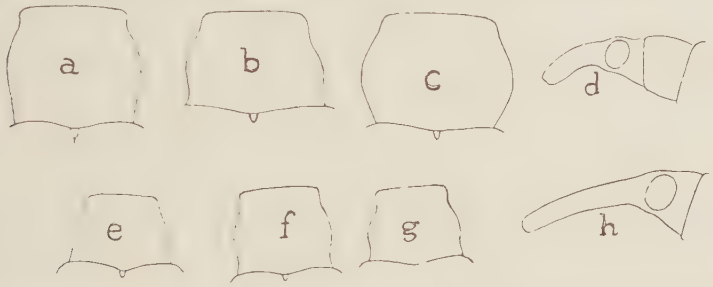


Fig. 38. Characters of Apion. *a*, Thorax not sinuate before the basal margin; *b*, thorax sinuate near basal margin; *c*, thorax widest before the base, not sinuate behind; *d*, head and beak of *emaciipes*; *e*, thorax of *crassum*; *f*, same of *decoloratum*; *g*, same of *emaciipes*; *h*, head and beak of male of *segnipes*. (After Fall.)

Group III.

The species of this group have the claws plainly, usually strongly toothed at base (Fig. 37, *k*, *l*.) and the tibiæ of male, at least two pairs of them, with small spines at tip. In almost all species the form is moderately robust, thorax more or less wider than long, wider behind and with a basal fovea; humeri well developed and the surface plainly pubescent. It is to this group that all the older and better known species except *segnipes* and *decoloratum* belong.

KEY TO EASTERN SPECIES OF GROUP III.*

a. Thorax slender, its sides nearly parallel, its base but little wider than apex; front coxæ of male with a conical tubercle at apex; surface bronzed. 85. COXALE.

aa. Sides of thorax not parallel, its base usually much wider than apex.

b. Thorax not sinuate on sides between middle and base, widest before the base (Fig. 38, *a*, *c*.); surface bronzed.

c. First joint of antennæ pale; tibiæ and base of femora reddish-brown; length 2.4 mm. 86. SMITHII.

cc. Antennæ and legs entirely dark; thorax much wider than long; length 1.5—2 mm. 87. METALLICUM.*

*Species marked thus * are so far known only from the South Atlantic coastal region. In addition to the species of the key, *A. tenuirostrum* Smith, for which the distribution is Kansas, Nebraska, Texas, Colorado and Montana, is included in Ulke's D. C. list, and Smith gave D. C. as one of his localities in the original description; also *A. oblitum* Smith, for which the distribution is Texas, Colorado and Nebraska, is included in Smith's New Jersey list, and Smith himself included Florida among his original localities. We have omitted both, however, as they are plainly western species, found by accident or misidentified in the East.

bb. Sides of thorax more or less sinuate behind the middle.

d. Base of thorax as wide or wider than middle. (Fig. 38, *b*.).

e. Antennæ inserted very near base of beak, the first joint nearly or quite reaching the eye.

f. Surface rather thickly clothed with white scale-like hairs, beak slender. 88. MODESTUM.

ff. Surface with fine, sparse pubescence; beak stouter. 89. PERVICAX.*

ee. Antennæ less basal, the first joint not reaching the eye.

g. Head excavated and polished beneath; surface reddish-bronzed. 90. GULARE.*

gg. Head beneath as usual.

h. Tibial spine with a short, subapical tooth on under side; first joint of antennæ barely as long as the next two, second joint reaching the eye; elytral striæ deep, the intervals convex. 91. PATRUELE.

hh. Tibial spine simple, without tooth.

i. Form elongate, elytra three-fourths longer than wide; body beneath sparsely punctate; third joint of female antennæ reaching the eye. 92. WALSHII.

ii. Form stouter, more obese; second joint of antennæ reaching the eye; body beneath more closely punctate.

j. First joint of antennæ shorter than the next two.

k. Tibial spine short, more or less subangulate beneath; thorax very coarsely punctate, its basal fovea deep, elongate, conspicuous; length 1.8—2.4 mm. 93. PERFORICOLLE.

kk. Tibial spine long, simple; intervals much wider than the striæ; length 1.5 mm. 94. NOVELLUM.

jj. First joint of antennæ subequal to the next two united.

l. Pubescence sparse.

m. Elytral intervals flatter; hairs beneath less scale-like; surface usually with bronzed lustre. 95. TURBULENTUM.

mm. Elytral intervals noticeably convex; vestiture beneath decidedly scale-like; surface without bronzed lustre. 96. IMPORTUNUM.*

ll. Pubescence conspicuous; elytral intervals flat, nearly twice as wide as striæ; surface usually bronzed. 97. GRISEUM.

dd. Thorax with the sides plainly narrowed before base, which is narrower than the middle; larger, 2 or more mm., except in *furtivum*.

n. Middle and hind tibiæ only mucronate in male.

o. Elytral intervals strongly convex; pubescence very sparse. 98. PORCATUM.

oo. Elytral intervals flat or nearly so.

p. Sides of elytra nearly parallel; pubescence very sparse; front tarsi of males not dilated; length 2.5—3.2 mm. 99. ROSTRUM.

pp. Elytra widest slightly behind middle, their sides curved; pubescence distinct; front tarsi of male dilated; length 2—2.5 mm. 100. NIGRUM.

nn. All the tibiæ mucronate in male, the front ones sometimes minutely so.

q. Upper margin of antennal fovea scarcely at all angulate (Fig. 37, *v.*); beak scarcely or not at all attenuate toward tip; length 1.7—1.9 mm. 101. FURTIVUM.*

qq. Upper margin of antennal fovea rather strongly angulate (Fig. 37, *u.*); beak strongly attenuate; length 2—2.5 mm. 102. CONFERTUM.*

85 (——). APION COXALE Fall, 1898, 134.

Elongate, rather slender. Black, sometimes with a feeble greenish-bronze lustre, finely and sparsely pubescent. Beak of male as long as head and thorax, feebly curved, finely striate and punctate in basal two-thirds, thence more finely punctate and shining to tip; of female longer, more slender, very finely striate and punctate throughout. Thorax about as long as wide, widest one-third from base; disc rather sparsely punctate, its basal fovea elongate. Elytra not quite twice as long as wide, slightly wider behind the middle in female; intervals feebly convex, less than twice as wide as striæ. Under surface rather sparsely punctate; side pieces of meso- and metasterna clothed with white, scale-like hairs. Length 1.9—2.1 mm.

Ranges from District of Columbia and North Carolina to Arizona and Lower California, and liable, therefore, to occur in Southern Indiana. The only species known to have the front coxæ tuberculate in male.

86. (8417). APION SMITHII Wagner, 1909, 767.

Moderately elongate, robust. Black, thorax opaque, elytra with purplish-bronze lustre; basal joints of antennæ reddish-brown; pubescence fine and sparse. Beak, in both sexes, as long as head and thorax, dilated about one-third from base; finely striate and punctate, tip polished. First joint of antennæ about equal to the next two, second reaching the eye, 7 and 8 wider than long. Front strongly punctate. Thorax slightly wider than long, base not much wider than apex, sides curved; disc very densely and coarsely punctate, its basal fovea small, round, deep. Elytra about two-thirds longer than wide, sides subparallel; intervals wide, flat, each with a single row of minute punctures. Under surface densely and rather coarsely punctate, side pieces of meso- and metasterna clothed as in *coxale*. Length 2.2—2.4 mm.

Wayne and Perry counties, Indiana, scarce; May 21—May 26. Taken by sweeping roadside herbage. Listed as *æneipenne* Smith, which name was preoccupied. Recorded heretofore only from Virginia and District of Columbia, where Chittenden states (1908, 31) it was taken on a common tick-trefoil, *Meibomia sp?* When the beetles were confined with the leaves they riddled them with minute holes. A handsome and easily recognized species.

87. (8415). APION METALLICUM Gerst., 1854, 243.

Black, more or less æneous, vestiture hairy, rather plentiful. Thorax wider than long, widest before the base; sides not at all sinuate posteriorly. (Fig. 38, *c.*) Elytral intervals wide, flat. Middle and hind tibiæ of male with slender, simple spine. Length 1.5—2 mm.

Occurs in North and South Carolina, Florida, Louisiana and Texas.

88. (8409). APION MODESTUM Smith, 1884, 58.

Short, rather slender. Black, somewhat plentifully clothed with white prostrate hairs. Beak slender, cylindrical, as long as thorax, male, or head and thorax, female; finely and sparsely punctate, polished in front of antennæ. Eyes prominent. Thorax slightly wider than long, its base and middle subequal in width, disc rather densely, not coarsely punctate. Elytra subparallel, male, slightly wider behind the middle, female, striæ fine; intervals feebly convex on sides, nearly flat above. Under surface rather sparsely and finely punctate. Length 1.5 mm.

Recorded from Illinois, Kansas, Nebraska, Florida and Arizona. Easily known by its small size, slender polished beak and basal insertion of antennæ.

89. (——). APION PERVICAX Fall, 1898, 139.

Black, with trace of æneous lustre; surface finely rugulose; pubescence fine, sparse. Beak of male barely as long as head and thorax, rather slender and noticeably attenuate, basal dilation not strong, surface polished beyond the dilation, punctuation fine and sparse; of female a little longer and more slender, polished only in apical third. Front wider than tip of beak. Thorax moderately closely punctured. Middle and hind tibiæ of male with very small spine. (Fig. 37, *p.*)Length 1.4—1.6 mm.

Described from Tampa and Hillsboro, Florida.

90. (——). APION GULARE Fall, 1898, 140.

Black with reddish-æneous lustre, legs rufescent; vestiture consisting of rather sparse squamiform hairs. Beak as long as head and thorax, male; longer, more slender, female, rather feebly curved, cylindrical, basal dilation moderate, tip slightly expanded, surface entirely shining, sparsely punctate. Middle and hind tibiæ of male minutely mucronate. Length 1.6—1.9 mm.

Described from Key West and Biscayne, Florida.

91. (8425). APION PATRUELE Smith, 1884, 64.

Short, robust, strongly convex. Black, shining, sparsely and finely pubescent; antennæ and tibiæ sometimes piceous. Beak rather stout, finely punctate, as long as head and thorax, male; longer and very finely punctate, female. Front sulcate. Thorax short, broader than long,

slightly narrowed near apex; disc coarsely and rather densely punctate, with a distinct rounded fovea at base. Elytra less than one-half longer than wide, humeri prominent, sides parallel to beyond middle, strial punctures large and deep, intervals nearly twice as wide as striæ. Under surface sparsely and finely, last ventral more coarsely, punctate. Length 1.6—2 mm.

Frequent throughout Indiana, more so in the northern counties; April 29—August 3. One from flowers of Celandine poppy, *Stylophorum diphyllum* Michx. on the earlier date; beaten from hazel and taken by sweeping. Sanford, Fla., April 9. Ranges from New England to Florida and west to Illinois and Texas. The short robust form, scant pubescence, short thorax and deep elytral striæ are its most distinguishing characters. "Found in numbers in July on a climbing wild legume at Cold Spring Harbor, New York, and doubtless inhabits its pods."

92 (8405). APION WALSHII Smith, 1884, 57.

Elongate, rather slender. Black, shining; pubescence fine but conspicuous. Beak feebly curved, finely striate and moderately punctate throughout, slightly longer than thorax, male; as long or longer than head and thorax, female. Front not sulcate. Thorax slightly wider than long, apex scarcely narrower than base; disc densely and rather coarsely punctate, its basal fovea small. Elytra widest behind the middle; striæ deep, intervals nearly twice as wide as striæ, more or less convex. Length 1.8—2.2 mm.

Ranges from Canada and New England to Michigan, Montana and California, south to Maryland. Probably a species of the Transition Life Zone. Recorded as occurring on white birch and in the galls of a willow.

93. (——). APION PERFORICOLLE Fall, 1898, 144.

Oval, robust. Black with faint brassy tinge; antennæ piceous; pubescence short, sparse, prostrate. Beak dilated behind the antennæ in both sexes, barely as long as head and thorax, thickly and coarsely punctate at base, apical third more shining, male; longer, very finely and sparsely punctate, female. Front coarsely punctate. Thorax slightly wider than long, sides subparallel to near middle, thence feebly curved to apex; disc very coarsely, deeply and densely punctate, the basal fovea large. Elytra scarcely one-half longer than wide, sides subparallel to behind the middle, striæ rather deep; intervals flat, not quite twice as wide as striæ. Under surface coarsely punctate. Length 2—2.4 mm.

Pulaski county, Indiana, scarce; June 19—July 16. Swept from the lead plant, *Amorpha canescens* Pursh. Determined by Fall. Recorded only from along the Atlantic coast—southern New Jersey to Georgia.

94. (——). Apion novellum Fall, 1898, 144.

Moderately robust. Black, pubescent. Beak of male barely as long as head and thorax, scarcely dilated, feebly narrowed toward the tip, not strongly or closely punctate, apical third polished; of female slightly longer, more slender, finely sculptured, very finely, sparsely punctate. Thorax plainly wider than long, widest a little behind the middle, subequal to the base, sides slightly sinuate before the base, which is somewhat expanded. Elytral intervals convex, much wider than the striæ; sutural angles rounded, male, not rounded, female. Middle and hind tibiæ of male with very long, slender spine, projecting at an angle with the tibiæ. (Fig. 37, *s*.) Length 1.5 mm.

Described from District of Columbia.

95. (8400). Apion turbulentum Smith, 1884, 56.

Short, rather robust. Black, usually with a purplish bronzed lustre, antennæ more or less brownish. Beak of male as long as head and thorax, minutely striate nearly to the tip, finely punctured above, more coarsely on sides; of female slightly longer, more slender and shining, very sparsely and minutely punctate throughout. Front with a median sulcus, and a line of punctures each side. Thorax short, wider than long, middle as wide as base; disc coarsely and rather densely punctate, the basal fovea small, elongate. Elytra one-half longer than wide, humeri prominent; sides parallel to middle; intervals nearly flat, scarcely twice as wide as striæ. Under surface sparsely punctate, more closely along the sides. Length 1.7—2 mm.

Frequent throughout Indiana; April 19—July 29. Beaten from the flowers of the panicled dogwood, *Cornus candidissima* Marsh., and swept from huckleberry. Dunedin, Fla., Jan. 26—March 16. Ranges from New York and Michigan, south and southwest to Arkansas and Texas. Said by Chittenden (1908, 31) to live in the seeds of a tick-trefoil, *Meibomia marylandica* L. Resembles *A. patruele* but distinguished by its bronzed lustre and flatter, more narrow intervals.

96 (——). Apion importunum Fall, 1898, 146.

Black, vestiture rather sparse, not fine. Claws toothed near base; middle and hind tibiæ of male with long, simple spine. Length 1.6 mm.

Occurs in Georgia and Florida. Very close to *turbulentum*, from which it is separated by characters given in key and presumably by the locality, *turbulentum* being heretofore unknown south of the Potomac River.

97 (8412). Apion griseum Smith, 1884, 59.

Rather elongate, robust. Black, faintly tinged with bronze; conspicuously clothed with gray or yellowish prostrate hairs. Beak as long or

slightly longer than head and thorax, distinctly narrowed toward tip, rather coarsely punctate and pubescent on basal two-thirds. First antennal joint as long as the two or three following, second and third subequal. Eyes prominent. Thorax wider at base than long, sides converging from base to apex; disc densely and rather coarsely punctate, its basal fovea small, distinct. Elytra one-third longer than wide, sides subparallel in basal three-fourths; striæ rather narrow, intervals wide and flat. Length 1.7—2 mm.

Occurs throughout Indiana, common in the southern counties, less so northward; April 12—August 4. Taken from beneath bark of oak and by sifting on the April date. Ranges from Quebec and New York to Florida and westward to Colorado and Arizona. Recorded by Chittenden (1908, 29) as living and hibernating in the seeds of the wild bean, *Phascolus polystachyus* L., and as doing damage to cultivated species of the same genus. *A. fraternum* Smith is said by Fall (1898) to be a synonym of *griseum* but Smith (1909, 381) claims that it closely resembles but is distinct from *griseum*. It was separated by "having the surface much more finely and sparsely pubescent, the humeri of elytra elevated." It occurs in the "southern and western states," and has been recorded as feeding on bush clover (*Lespedeza*) and the small wild bean, *Strophostyles pauciflora* Benth.

98 (——). APION PORCATUM Boh., Schön., 1839, 374.

Large, very robust. Black, shining; antennæ piceous; pubescence very fine, sparse and inconspicuous. Beak as long, male, or slightly longer, female, than thorax, minutely and sparsely punctate, polished in front of antennæ which are short; first joint slightly longer than the next two, the second reaching the eye. Thorax wider at middle than long, widening from apex to middle, thence either subparallel or slightly sinuate to base; disc densely and rather coarsely punctate, the basal fovea elongate, deep. Elytra one-fourth longer than wide, humeri prominent; striæ wide, deep, coarsely punctate; intervals strongly convex, but little wider than the striæ. Under surface rather coarsely and sparsely punctate. Length 2.4—2.7 mm.

Clark, Floyd, Perry and Posey counties, Indiana, scarce; April 19—June 21. Taken by sweeping. Near New York City it is always found on locust with *nigrum*. Ranges from Massachusetts, Virginia and Kentucky to Nebraska and Texas. Known by the large size, short convex elytra, sparse pubescence and strongly convex intervals.

99 (8423). APION ROSTRUM Say, 1826, 253; ibid, II, 316.

Robust, elytra subdepressed. Black, feebly shining; pubescence as in *porcatum*. Beak rather stout, as long as thorax, dilated at base, finely punctate and with an elongate puncture above the insertion of the antennæ. First joint of antennæ as long as the next two, not reaching the

eye. Front sulcate, eyes prominent. Thorax wider than long, sides rounded at middle, narrowed before the base; disc densely, coarsely and confluently punctate, the basal fovea oval, large, deep. Elytra one-half longer than wide, humeri prominent; intervals flat, twice as wide as striæ, each with a single row of minute, shallow, hair-bearing punctures. Under surface coarsely and closely punctate. Length 2.5—3.2 mm.

Pulaski, Starke and Wells counties, Indiana, frequent; June 18—October 2. Taken from the pods of the false indigo, *Baptisia leucantha* T. & G. in the seeds of which the larvæ live. Said to breed also in the seed pods of other plants of the same genus. Staten Island, N. Y., Sept.; Peekskill, N. Y. Ranges from New Hampshire to Florida and westward to Wisconsin and Texas. Our largest Indiana species of *Apion*.

100 (8424). APION NIGRUM Hbst., 1797, 122.

Moderately robust, not very convex. Black, feebly shining; distinctly but sparsely pubescent. Beak of male as long as or slightly longer than thorax, dilated at base, finely punctate, pubescent; of female longer, scarcely dilated, glabrous. First antennal joint subequal to the three following, second reaching the eye. Front not sulcate. Thorax short, slightly wider than long, narrower at apex and base, sides rounded; disc coarsely, closely and shallowly punctate, the basal fovea distinct. Elytra one-half longer than wide, striæ deep; intervals flat or feebly convex, punctate as in *rostrum*. Under surface strongly and rather closely punctate. Length 2—2.5 mm.

Throughout Indiana, frequent; April 22—June 28. On locust, Milburn, N. J., May—June; Black Mts., N. C. Ranges from New England to Iowa and Kansas. Breeds in the seeds of the black locust, *Robinia pseudacacia* L., the adults sometimes riddling the leaves of the trees by cutting small round holes in them. Recorded also as feeding upon the foliage of the peach and wild cherry. The male is unique among all others of that sex in our fauna in having the front tarsi dilated.

101 (——). APION FURTIVUM Fall, 1898, 154.

Not very robust. Black, sparsely pubescent. Beak barely as long as head and thorax, male, scarcely attenuate; obviously longer, female. Thorax with the sides plainly narrowed behind the middle, which is as wide, or even wider than the base; basal fovea deep, elongate. Elytral striæ shallow, intervals flat; sutural angles rounded, male; not rounded, female. All the tibiæ with a short mucro, that of the front ones minute. Legs rather slender, beneath sparsely punctate. Length 1.7—1.9 mm.

Described from Georgia.

102 (8422). APION CONFERTUM Smith, 1884, 63.

Similar to *rostrum*, but a little smaller and more elongate; robust, not very convex. Black, sparsely pubescent. Tarsi smaller, the second joint

longer than wide and longer than the lobes of the third joint. All the tibiæ of male armed with a short, nearly simple mucro. Length 2—2.5 mm.

Occurs at Jacksonville and other points in Florida.

GROUP IV.

Our species of this group have the tarsal claws toothed and the tibiæ of males unarmed at tip. With the exception of *perminutum* and *smithii*, all the Indiana species having the body or appendages notably paler than black belong to this group. Of the 35 species ascribed to the group by Fall, 16 are known from our territory.

KEY TO EASTERN SPECIES OF GROUP IV.*

a. Color black; appendages often pale.
b. Front coxæ (at least in male) yellow; femora, front and middle tibiæ yellow. 103. AURIPES.*
bb. Coxæ dark.
c. Antennæ at least in part pale.
d. Legs wholly black.
e. Thorax widest at base; first two joints and club of antennæ paler; beak shorter than head and thorax. 104. HURON.
ee. Thorax widest at middle; first joint of antennæ pale; surface with whitish hairs. 105. VARICORNE.*
dd. Legs in great part pale; club dark.
f. Larger, 2—2.6 mm.; beak as long or longer than head and thorax. (Fig. 38, *h.*) 106. SEGNIPES.
ff. Smaller, not over 1.7 mm.; beak short, stout, scarcely longer than thorax. (Fig. 38, *d.*)
g. Pubescence well marked; thorax feebly constricted near apex (Fig. 38, *f.*); beak as long or longer than thorax; tibiæ annulate with black. 107. DECOLORATUM.
gg. Pubescence fine, sparse, inconspicuous; thorax deeply constricted behind apex (Fig. 38, *g.*); beak very short, broad, subequal in length to thorax; tibiæ wholly pale. 108. EMACHIPES.
cc. Antennæ entirely black or at most piceous at base.
h. Tarsi of male not spined on inner side near apex; legs black or piceous.
i Thorax subconical (Fig. 38, *e.*); legs black or rufescent. 109. CRASSUM.
ii. Thorax with apical constriction.
j. Elytral intervals strongly convex; beak longer, tapering. 110. CARINATUM.
jj. Elytral intervals feebly convex; beak shorter, parallel. 111. ATTENUATUM.

*Species marked thus * are so far known only from the South Atlantic coastal region. In addition to the species of the key *A. spinipes* Fall, described from Arizona, is included in the New Jersey list, possibly through misidentification; and *A. ventricosus* Lec., distributed through Colorado, Texas and westward to Southern and Lower California, is on the D. C. list, and Smith gives Massachusetts as a locality. We believe this also must be an error.

hh. First joint of middle tarsi of male with a spiniform process on inner side. (Fig. 37, *t.*)

k. Hind margin of antennal fovea extending obliquely backward as usual.

l. Larger, 2.2 mm.; pubescence conspicuous; humeri well developed; metasternum normal. 112. EXTENSUM.

ll. Smaller, 1.4—2 mm.; pubescence inconspicuous; humeri wanting; metasternum shorter than first ventral. 113. PARALLELUM.

kk. Hind margin of antennal fovea transverse; length 1.5—1.7 mm. 114. PERSIMILE.*

aa. Color wholly or in part brown or pale.

m. Color pale reddish-brown; pubescence uniform, yellow; length 1.6—1.8 mm. 115. LIVIDUM.*

mm. Color darker; pubescence unevenly distributed.

n. Thorax feebly constricted in front, widest at base; claws feebly toothed.

o. Second joint of antennæ, male, or third joint, female, reaching the eye; beak dull nearly to tip, obviously longer in female; subapical callus of elytra weak; length 2—2.4 mm. 116. PURITANUM.

oo. First joint of antennæ reaching the eye; subapical callus strong; length 3—3.1 mm. 117. UMBONIFERUM.

nn. Thorax rather strongly constricted in front, as wide or wider behind than at base; claws distinctly though not strongly toothed; beak in great part polished, almost without trace of the finer sculpture in apical half, subequal in the sexes; length 2.5—2.9 mm. 118. HERCULANUM.

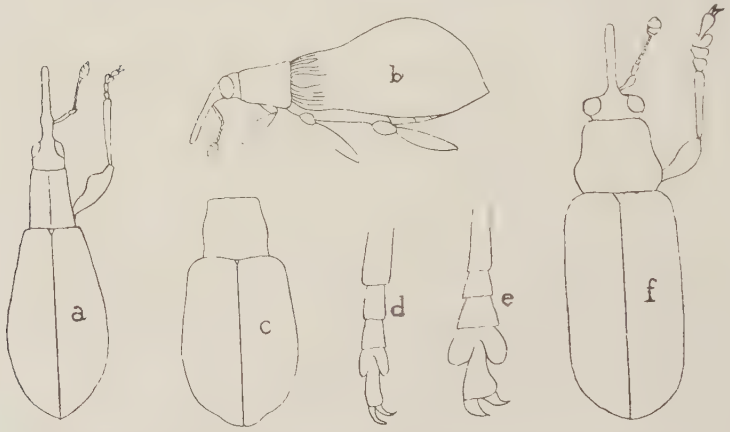


Fig. 39. *a, Apion obsoletum; b, A. herculanum,* side view; *c, A. puritanum; d,* usual form of tarsus of *Apion; e,* tarsus of *Podapion; f, Podapion gallicola.* (After Smith & Fall.)

103 (——). APION AURIPES Fall, 1898, 157.

Moderately slender. Black, front coxæ, all the femora and the front and middle tibiæ yellow; hind tibiæ and all the tarsi dusky; pubescence fine and sparse. Length 2 mm.

Florida. Described from a single male in the Ulke collection. Looks like the European *assimile*. (Fig. 36.)

104 (——). APION HURON Fall, 1898, 159.

♂. Robust. Black, antennæ piceous, the two basal joints and club reddish-brown; pubescence fine, plentiful, clothing the beak throughout in male, wanting beyond the antennæ in female; densely clothing also the front coxæ and prosternum and forming a whitish fringe partly around the eyes. Beak feebly curved, scarcely dilated, barely longer than thorax, male, finely striate and punctate. Front flat, without a depression near the eyes. Thorax slightly wider than long, sides divergent from apex to middle, thence parallel to base; disc densely and strongly punctate, its basal fovea lineal. Elytra one-third longer than wide, broadest behind the middle; striæ nearly as wide as intervals, the latter flat. Under surface coarsely and rather closely punctate. Length 2—2.5 mm.

Known from Quebec, Ann Arbor, Mich., and Illinois.

105 (8414). APION VARICORNE Smith, 1884, 60.

Black, often with more or less bronzed lustre; rather conspicuously clothed with whitish hair, which becomes scale-like in front and beneath and forms a ring about each eye; first joint of antennæ pale. Beak nearly straight in basal three-fourths. Thorax widest before base, finely alutaceous, its punctures well separated. Length 1.5—1.9 mm.

Dunedin, Florida, April 13—November 22. Frequent on the flowers and foliage of huckleberry. Known only from Georgia, Florida, Texas and Oklahoma. Breeds in the flower-heads of *Parosela aurea* Nutt. (*Pierce.*)

106 (8411). APION SEGNIPES Say, 1831, 6; ibid, I, 264.

Oval, robust. Black, basal joints of antennæ, femora except the knees, and tibiæ reddish; pubescence conspicuous, consisting of elongate grayish prostrate hairs. Beak slender, nearly straight, as long as head and thorax, male (Fig. 38, *h*.), longer and more slender, female; finely striate and punctate throughout. First joint of antennæ as long as the next two, male, or three, female, second joint not reaching the eye. Front punctate, not channeled. Thorax subconical, slightly wider at base than long, disc coarsely and densely punctate, the basal fovea small or obsolete. Elytra nearly parallel in basal two-thirds, striæ narrow; intervals wide, flat, each with two irregular rows of minute punctures. Length 2—2.6 mm.

Frequent throughout Indiana, more so in the northern counties; May 9—August 8. Taken from the ripening pods of the goats' rue, *Cracca virginiana* L., and by sweeping. Lakehurst, N. J., July. Clayton, Ga., June. Dunedin, Fla., April 3—Nov. 9. Ranges from New England and Ontario to Florida, Kansas and Texas. Breeds also in the seeds of the milk vetch (*Astragalus*),

although the seeds of the goats' rue are recorded by most observers as the food of its larvæ. Probably occurs wherever the two plants are found. The entire antennæ except the club are often pale, and the pubescence is in dense patches at the bases of the third intervals, on the front coxæ and the side pieces of the meso- and metasterna.

107 (8388). APION DECOLORATUM Smith, 1884, 52.

Small, oval. Black, legs reddish-yellow, the femora and tibiæ with a dusky ring; antennæ, except the club, usually reddish-brown; pubescence short and sparse but distinct. Beak moderately punctate, pubescent in both sexes. First joint of antennæ not much longer than second, the latter almost reaching the eye. Front but little wider than the tip of beak. Thorax about as long as wide, one-half wider at base than apex, sides feebly curved, subparallel in basal half; disc coarsely and closely punctate, the basal fovea small. Elytra one-half longer than wide; intervals flat, not much wider than the striæ. Length 1.5—1.7 mm.

Marshall, Knox and Clarke counties, Indiana, scarce; probably throughout the State; May 6—August 15. Taken by sifting on the earlier date; bred from the seeds of *Lespedeza* and *Meibomia* in the State Entomological Laboratory in August. Ranges from New England to North Carolina west and southwest to Iowa and Arizona. Chittenden (1908, 31) records it as breeding in the seeds of the tick-trefoils, *Meibomia paniculata* L. and *M. grandiflora* Walt., and exit holes noted in pods of all other species of *Meibomia* about Washington, D. C., the beetles issuing in late September.

108 (——). APION EMACIIPES Fall, 1898, 166.

Form more obese than in *decoloratum*. Black, legs entirely yellow, or with the femora piceous, antennæ either pale throughout or almost wholly piceous; pubescence finer and more sparse. Beak distinctly shorter, stouter and more coarsely and irregularly punctate. Thorax smaller, wider than long, more constricted near apex; disc coarsely, closely and unevenly punctate. Elytra broader with more prominent humeri. Under surface coarsely and closely punctate. Length 1.4—1.8 mm.

Kosciusko County, Indiana, rare; June 24. Taken by sweeping. Fredericksburg, Va. Known from New Hampshire to Maryland, Michigan and Illinois, south to Florida. Easily distinguished from the preceding by the shorter and wider beak and wholly pale yellow tibiæ.

109 (——). APION CRASSUM Fall, 1898, 165.

Robust. Black, legs faintly rufescent; pubescence fine and sparse. Beak of male strong, subparallel, fully as long as head and thorax, abruptly angularly dilated over the insertion of the antennæ at basal fourth;

surface dull, coarsely but not deeply, irregularly punctate at the sides, less coarsely above, a fine impressed line from base to middle. Thorax subconical, sides nearly straight, apical and basal constrictions lacking; punctuation moderately close, superficial. Claws evidently toothed near base, tibiæ unarmed. Length 2.8 mm.

Known from Pennington Gap, Va., and Southern Pines, North Carolina.

110 (8390). APION CARINATUM Smith, 1884, 52.

Rather stout. Black; antennæ, tibiæ and tarsi sometimes piceous; pubescence fine, very sparse. Beak stout, slightly shorter than head and thorax, rather coarsely punctate and with a groove between the antennæ. Antennæ short, first joint scarcely as long as the next two combined, 6—8 wider than long, fourth reaching the eye. Front narrow, deeply bisulcate. Thorax broader than long; sides subparallel on basal half, thence converging to apex; disc densely and rather coarsely punctate, the basal fovea small, distinct. Elytra one-third longer than wide, humeri prominent; striæ wide, deep, the punctures large; intervals narrow, strongly convex. Length 1.5—1.8 mm.

Known from New England to Florida, west to Nebraska. Nothing regarding its habits has been recorded.

111 (8420). APION ATTENUATUM Smith, 1884, 62.

Rather elongate. Black; legs and antennæ sometimes dark brown or piceous, pubescence rather sparse. Beak rather stout, equal to or slightly shorter than head and thorax, coarsely, more or less rugosely punctate. First joint of antennæ slightly shorter than next two united, the second not reaching the eye, the others broader than long. Thorax as long as wide, sides as in *carinatum*; disc rather finely, shallowly and somewhat densely punctate, the basal fovea small, linear. Elytra more than one-half longer than wide, sides feebly divergent to beyond middle; striæ wide, distinctly punctate; intervals one-half wider than striæ. Length 1.7—2 mm.

Ranges from Toronto, Canada, and Michigan to Oregon, south to Texas and Lower California. Not yet identified from Indiana, but undoubtedly occurs.

112 (8416). APION EXTENSUM Smith, 1884, 61.

Elongate, rather slender. Black, feebly shining, antennæ, except the club, dark reddish brown; surface rather thickly clothed with gray prostrate hairs which are massed on the front coxæ and the sides of the meso- and metasterna. Beak subequal in length to head and thorax, evenly curved, finely striate and punctate. First joint of antennæ nearly as long as the three following, second reaching the eye, outer joints wider than long. Thorax cylindrical, about as long as wide, one-fourth wider at base than apex; disc rather coarsely and densely punctate, the basal fovea small. Elytra narrow, subparallel; striæ fine, shallow, intervals feebly convex. Under surface deeply, rather coarsely and closely punctate. Length 2—2.3 mm.

Vermillion County, Indiana, rare; June 15. Determined by Fall. Known heretofore from Dakota, Kansas and Montana.

113 (8368). APION PARALLELUM Smith, 1884, 47.

Elongate, slender. Black, finely and sparsely pubescent; first antennal joint often yellow. Beak of male about as long as head and thorax, finely striate, sparsely punctate; of female a little longer, less narrowed toward tip. First joint of antennæ equal to the next two, male, or three, female, joints 6—8 wider than long. Thorax as long as wide, base barely wider than apex, sides feebly curved; disc strongly and rather closely punctate, median line incomplete, basal fovea present. Elytra narrow, striæ wide, punctures distinct; intervals narrow, convex. Under surface deeply, rather coarsely and closely punctate. Length 1.5—2 mm.

Various localities in New Jersey in June and July. Recorded from Massachusetts, New Jersey, Michigan, Illinois and Tennessee.

114 (——). APION PERSIMILE Fall, 1898, 172.

Moderately robust. Entirely black; pubescence rather conspicuous, consisting of perfectly recumbent cinereous hairs, which are more or less scale-like, especially on the head, thorax and lower surface; on the elytra they form a single tolerably even line on each interval. Beak of male shorter than head and thorax, feebly dilated close to the base, slightly narrowing to tip, apex shining, otherwise dull and moderately punctate; of female slightly longer and more slender. Length 1.5—1.7 mm.

Described from specimens in Zimmermann collection, probably from the South Atlantic coast region.

115 (10,814). APION LIVIDUM Smith, Ent. Amer., 1887, 56.

Short, oval. Pale reddish-brown, legs yellowish; pubescence fine, sparse, yellowish. The only species of this color, resembling *emaciipes* and *carinatum* in structure. Length 1.6—1.8 mm.

Pelican Bay, Lake Okeechobee, Fla.; very common on the dead vines of the wild cucumber (*Melothria*) and in dense masses of Spanish moss; March 5. Ormond, Dunedin and Crescent City, Fla.; Feb. 23—Apr. 14. Known only from Florida.

116 (——). APION PURITANUM Fall, 1898, 174.

Moderately elongate, wider behind. Piceous-brown, the suture slightly darker; pubescence of coarse, grayish-white hairs massed to form a curved line on basal half of each elytron, a transverse subapical band, a spot at base of third interval and a blotch on the sides of meso- and metasterna. Beak about as long as head and thorax, male, distinctly longer, female, finely striate and punctate and rather dull nearly to tip. First antennal joint subequal to the next two, the second, male, or third, female, reaching the eye. Thorax as long as wide, slightly wider at base, moderately punctate, basal fovea small, narrow. Elytra one-half longer than wide, widest behind middle; intervals feebly convex. Length 2—2.4 mm. (Fig. 39, *c.*)

Lake County, Indiana, rare; June 21. Known from Massachusetts, New York and New Jersey to Missouri and Illinois. On *Viburnum* in June near New York City.

117 (——). APION UMBONIFERUM Fall, 1898, 174.

Form and appearance of *puritanum* but larger and slightly more elongate. Thorax with sides more curved near base, its basal fovea larger, more shallow. Elytra with pale hairs of base more scattered, not condensed at base of third interval or along the suture, the intervals wider, the fifth with a prominent callus on the declivity. Sides of body beneath less densely pubescent. Length 3—3.1 mm.

Described from Odenton and Harper's Ferry, Md. Probably only a variety of *puritanum*.

118 (8403). APION HERCULANUM Smith, 1884, 56.

Differs from *puritanum* in having the base and extreme tip of elytra darker, the pubescence most noticeably condensed at base along the suture, the beak polished and shining, the sides of the thorax more strongly rounded and the claws more strongly toothed. Length 2.5—2.9 mm. (Fig. 39, *b*.)

South Orange, N. J., and Peekskill, N. Y., on witch hazel; June. Ranges from Ontario and New England to Michigan and West Virginia. Recorded by Hamilton as being abundant in Western Pennsylvania in June on the maple-leaved arrow-wood, *Viburnum acerifolium* L.; also by Chittenden as reared from the dried fruit of the sheepberry, *Viburnum lentago* L., and from those of dogwood, *Cornus sp.?*

In addition, the following species of *Apion* which could not be recognized by Smith or Fall, have been described, viz.:

(——). APION NODIROSTRE Gerst., 1854, 261.
Black, subæneous, slightly pubescent. Length 2—3 mm.

Occurs in Florida.

(8399). APION SUBGLOBOSUM Gerst., 1854, 243.
Dark æneous, very finely gray pubescent. Length 1.6 mm.

From North America.

(——). APION RECONDITUM Gyll., Schön., 1839, 432.
Blackish-æneous, almost shining, glabrous. No size given.

Pennsylvania.

(——). APION VILE Gerst., 1854, 249.
Black, elongate, not pubescent, shining. Length 1.5 mm.

Occurs at Baltimore.

II. Podapion Riley, 1883. (Gr., "foot" + "pear.")

Here belongs a single large species of gall-making Apionid having, in addition to the characters named in generic key, the beak joining the head abruptly; elytral striæ wide; legs short, robust; coxæ narrowly separated; tarsi strongly dilated, the joints wider than long, the third much the widest (Fig. 39, *e*); claws simple. Larger and more elongate than any of our species of *Apion*, at first sight resembling a *Magdalis* but possessing the characters of the subfamily Apioninæ.

119 (8426). Podapion gallicola Riley, Bull. Brook. Ent. Soc., VI, 1883, 62.

Elongate, subcylindrical, parallel. Black, opaque, antennæ and tarsi piceous; pubescence very sparse, rather long, whitish. Head broad, front rugosely punctate; eyes large, prominent; beak of male as long as thorax, slender, not dilated, sparsely and very finely punctate; of female, slightly longer, more slender and almost devoid of punctures. Antennæ as long as beak, inserted close to its base; first joint clavate, as long as the two following united, 2—8 gradually decreasing in length. Thorax subcylindrical, as wide as long, widest at middle, constricted near apex; disc finely and densely punctate, without median line or fovea. Elytra elongate, sides parallel to near apex, striæ deep, wide, with an apparently double row of irregular close-set punctures; intervals flat, slightly wider than striae, finely alutaceous. Under surface scabrous and finely punctate. Length 3—4.5 mm. (Fig. 39, *f*.)

Dunedin, Fla.; March 31; one specimen swept from Ericads. Washington, D. C.; May 27. Ranges from New England to California, south to Arkansas and Florida. Riley (loc. cit.) first found the species forming galls on the Jersey or scrub pine, *Pinus virginiana* Mill. The gall formed on the two-year old twigs is spherical or ovoid, rarely elongate, 6—18 mm. in length and smoother but of the same color as the twig. Its interior is hard, woody, and usually with an abundance of liquid resin. The adult beetle, known as the "pine gall weevil," emerges in May or June, but one developing in each gall. As the fresh galls are found only in spring, it is probable that the egg is laid in the one-year old wood in June, and that either the egg or the larva remains in the twig without producing the gall until the following spring. Blanchard found the adult on the pitch pine, *P. rigida* Mill., in Massachusetts, and Harrington both galls and beetles on the red pine, *P. resinosa* Ait., near Ottawa, Canada.

Subfamily VI. ALLOCORHYNINÆ.

Beak very slender, cylindrical, slightly curved, somewhat longer than head and thorax, female; antennæ straight, inserted close to the eyes on the under side of the beak, with a very loose,

three-jointed club, basal joint elongate; mouth parts very small, mandibles exhibiting no trace of angles; thorax flat, without lateral margins; prosternum short, nearly all its length being occupied by the subglobose front coxæ; abdominal segments subequal in length; tips of elytra separately rounded leaving the pygidium exposed; epipleuræ narrow from the humeri and disappearing about middle of elytra; tarsi broad, formed like those of a Clavicorn, first and second joints broad, third bilobed, fourth small but visible between the lobes of the third, terminal joint large with rather large claws, joints 1—3 with long hairs projecting from the sides; hind femora very broad, their upper margin strongly curved, crenulate. The only genus is

Fig. 40. A, adult, × 9; B, hind femur, showing crenulate outer margin. (Original.)

I. ALLOCORHYNUS Sharp, 1889.

To this genus, sufficiently characterized above, belong two known species, one described from Mexico, the other from Florida.

120 (——). ALLOCORHYNUS SLOSSONI Schæff., Sci. Bull. Mus. Brook. Inst., I, 1905, 139.

Oblong, depressed. Reddish-yellow; elytra black, with an elongate reddish-yellow humeral space. Beak punctate in male, smooth, shining and longer in female; head transverse, coarsely and sparsely punctured; antennæ with second joint shorter than the first, third subequal to the next two, 4—8 moniliform; last joint of club narrower, oval and acuminate at apex. Thorax about twice as wide as long, sides crenate, broadly rounded to the front, apex truncate, base feebly curved; hind angles obsolete, broadly feebly rounded; disc smooth, shining, rather finely and sparsely punctate, minutely alutaceous between the punctures. Elytra not wider at base than thorax, shorter than abdomen, leaving the last segment exposed; sides gradually but slightly diverging to apex, tips broadly and separately rounded; disc finely subrugose, punctured as the thorax, the punctures slightly finer toward apex. Under surface smooth and shining; metasternum and abdomen very sparsely and finely punctate. Length, including beak, 3.5 mm. male; 4.2 mm., female. (Fig. 40.)

Biscayne Bay, Fla. Discovered by Mrs. A. T. Slosson, to whom it was dedicated. The beetles, as well as the larvæ, live in the cone-shaped aments of the flowers and fruits of the "coontie" or Florida arrow-root, *Zamia integrifolia* L.

Subfamily VII. ITHYCERINÆ.

The single large species which represents this subfamily in the Eastern United States has the mandibles emarginate at tip,

with an inferior cusp; mentum large, quadrate, supported on a short, broad gular peduncle; beak one-half longer than head; eyes small, rounded; antennæ straight, first and second joints subequal, third distinctly longer than second, 4—8 gradually a little shorter and broader; club small, oval, pointed; ventral segments nearly equal in length, the sutures straight; front coxæ contiguous, middle ones narrowly separated; tibiæ truncate at tip; tarsi broad, spongy pubescent beneath, third joint deeply bilobed; claws armed at middle with a small acute tooth. The name of the subfamily is based upon that of the single genus.

I. ITHYCERUS Schön., 1826. (Gr., "straight" + "horn.")

This genus, sufficiently characterized above, is in turn represented in our territory by the single species:

121 (8361). ITHYCERUS NOVEBORACENSIS Forst., 1771, 35.

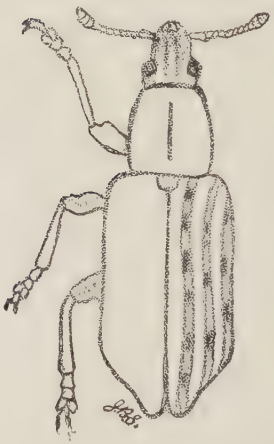


Fig. 41, × 3. (After Packard.)

Elongate-oblong, robust. Black, shining, rather sparsely clothed with a mixture of ash-gray and pale brown prostrate hairs, the former in fresh specimens massed to form a narrow median and two wider lateral stripes on thorax and a very narrow pale stripe along each alternate interval of elytra, each of these being broken by three or four small rounded tufts of black hairs, thus giving the surface of elytra a peculiar mottled appearance; scutellum dirty white. Head and beak slightly longer than thorax, the beak carinate along its middle, densely rugose-punctate. Thorax subcylindrical, about as wide as long, apex and base truncate, sides scarcely rounded, disc densely rugose-punctate. Elytra at base nearly twice as wide as thorax, sides parallel for four-fifths their length, then suddenly converging to an obtuse apex; disc indistinctly striate, striæ coarsely punctate; intervals feebly convex, densely rugose. Anal segment of male very convex, visible from beneath; pygidium deeply grooved in both sexes, projecting slightly beyond the elytra. Length 12—18 mm. (Fig. 41.)

Frequent throughout Indiana; more so in the northern counties; May 19—July 12. Beaten from oak, hickory and beech, and often found resting on the trunks of beech. Not rare near New York City in June. Clayton, Georgia, in the mountains. Riley calls it the "New York weevil," as Forster gave it the name of *novcboracensis*, which means New York, doubtless because he received it from that State. It is the largest Curculionid occurring in Indiana, and ranges from Canada and New England as far as west and south as Nebraska, Georgia and Texas. According to

Riley (1871, 57) it breeds in the twigs and tender branches of the bur oak, *Quercus macrocarpa* Michx.; probably also in those of the pig-nut hickory, *Hicoria glabra* Mill. He states that it does much damage to fruit trees in the spring by gnawing off the tender bark of the twigs before the buds have put out, and later in the season by devouring the tender shoots. The female, in ovipositing, first makes a small longitudinal excavation with her jaws, eating upward toward the end of the branch, then turns around and thrusts her egg into it.

Subfamily VIII. TACHYGONINÆ.

Very small species, so differing in structure and appearance as to be readily recognized among all other Curculionids. They have the body broadly ovate, subdepressed, usually partly clothed with semi-prostrate hairs and ornamented with tufts of pubescence; head small; eyes large, very narrowly separated; beak short, broad, and in repose received in a groove between the front coxæ; antennæ straight, 11-jointed, inserted near base of beak, the first joint or scape shorter and narrower than second, club elongate-oval, distinctly annulated; thorax short, much narrower than elytra, which do not cover the pygidium; first and second ventral segments very large and connate, third and fourth very short, fifth nearly as long as second, its apex rounded; coxæ all widely separated, the hind ones extremely so, being situated near the side margins of elytra; front and middle legs slender, the tibiæ armed with a terminal hook; third tarsal joint widely dilated, fourth as long as the first, its claws widely separated and appendiculate. The hind legs (Fig. 15) are much longer and stouter than the others, being so modified as to clasp the leaves upon which the insect rests; as they are widely separated, they are capable of being spread far apart, thus giving to the owner a grasping power very great in proportion to its small size. The beetles rest for the most part on the under side of leaves and fall to a lower leaf or to the ground when disturbed. When about to alight they turn back downwards and grasp the leaf with the long curved hind legs.* One genus is known from the United States, which is represented also in Mexico and South America.

I. TACHYGONUS Schön., 1833. (Gr., "swift" + "elbowed.")

To this genus, sufficiently characterized above, belong seven nominal species, four of which have been recorded from the eastern States. For a synopsis of the species see:

*Zimmermann, Germ. Zeitsch., II, 1840, 155.

Casey, T. L.—Ann. N. Y. Acad. Sci., IX, 1897, 679—681.

KEY TO EASTERN SPECIES OF TACHYGONUS.

a. Hind femora armed beneath with several long slender teeth.

b. Hind tibiæ broad, strongly curved, feebly toothed on outer margin; elytra with four tufts of dense white pubescence arranged in pairs near and behind the middle, the hind pair widely separated.

c. Reddish brown, mottled with black; hind femora and base of tibiæ partly reddish. 122. LECONTEI.

cc. Black, elytra abruptly red at apical margin; hind legs black, femora red only above near the base; subsutural tufts diffused, not well defined. 123. SPINIPES.

bb. Hind tibiæ long, narrow, nearly straight, not toothed on outer margin; elytra black with a median reddish band, the pubescent tuft single, small, central and divided by the suture. 124. GRACILIPES.

aa. Hind femora finely serrulate, or with several small teeth beneath; hind tibiae slender, slightly curved; elytra brown, variegated with dusky, the tuft of pubescence as in *gracilipes*; hind legs brown. 125. FULVIPES.

122 (8821). TACHYGONUS LECONTEI Gyll., Schn., 1833, 312.

Broadly oval, subdepressed. Above reddish-brown, the center of thorax and two or three spots on each elytron black, the surface rather thickly clothed with white and tawny prostrate divided hairs, and numerous erect black or white bristles; disc of thorax with a tuft of black hairs each side of middle, and elytra with four smaller tufts of white ones; under surface and hind tibiæ black; front and middle legs and all the tarsi pale reddish-brown. Thorax bell shaped. Elytra broadly oval, widest one-third from base, where they are nearly twice as wide as thorax, thence rapidly converging to the rounded apex; disc with rows of very coarse punctures; under surface coarsely and densely punctate. Length 2—2.5 mm.

Fig. 42. *Tachygonus lecontei* Gyll. × 10; *a*, view of head and antennæ; *b*, hind leg. (After Lugger.)

Recorded from Caldwell, Lakehurst, Gloucester and Atco, N. J.; July—Sept. Jacksonville and Ormond, Fla., April 7—15. Mobile, Ala., April 15. Ranges from New Jersey to Texas in the coastwise states. Occurs on the leaves of young oaks.

123 (——). TACHYGONUS SPINIPES Casey, 1897, 680.

Allied to *lecontei* but much smaller and less pubescent above. Black

throughout, except the tip of the elytra, which is red; antennæ and four anterior legs pale flavotestaceous; basal half of hind femora above and distal extremity of corresponding tarsi pale rufous; beak rufous at tip. Hind tibiæ much narrower, less bent and only feebly undulated along the external edge. The prostrate white hairs of the body, as in *lecontei*, are composite, consisting of three to seven hairs split from a very short common footstalk.* Length 2.1 mm.

Described from New Jersey. Recorded by Smith from English Creek, Iona, Landisville, Dacosta and Seaville, N. J.; also taken at Lakehurst and Yaphank; May 20—Oct. 1. Occurs on oak.

124 (——). TACHYGONUS GRACILIPES Casey, 1897, 680.

Broadly oval, subdepressed. Black, shining, elytra with a narrow sutural stripe and a broad median cross-bar, pale reddish-brown; antennæ, tip of beak, front and middle legs pale brownish-yellow; hind legs black, the tarsi and tips of tibiæ paler. Thorax conical, coarsely, sparsely and irregularly punctate. Elytra shaped as in *lecontei*, the disc with rows of large, deep, close-set punctures, each bearing an erect grayish seta; intervals narrow, convex; a small tuft of soft white hair on the suture near basal fourth and numerous scattered, semiprostrate hairs near tip. Under surface coarsely and sparsely punctate, sparsely pubescent, more densely along the sides. Hind tibiæ longer than the tarsi, slightly curved, finely subserrate on the outer side. Length 2.2—2.5 mm.

Posey County, Indiana, rare; June 11. Described from Ohio. Recorded as *T. tardipes* Lec. from Ohio by Dury, who took it in numbers by beating white elm, *Ulmus americana* L., June 19; also under the same name as rare near Washington, D. C., by Ulke. *Tardipes* is a southwestern species described from Texas, and Casey's *rhombus* from Arizona is probably only a melanistic form of it.

125 (8824). TACHYGONUS FULVIPES Lec., 1876, 266.

"Brown, feet uniform reddish-testaceous. Body above thinly clothed with long, erect gray hairs; thorax sparsely and coarsely punctured, with a tuft of white hairs at the basal angles. Elytra with regular striæ composed of large punctures, intervals narrower than in *tardipes;* an elongate sutural spot of white hair in front of the middle. Hind thighs with about four small teeth on the under side; hind tibiæ comparatively shorter than in *tardipes*, not serrate on the outer edge. Length 1.8 mm." (*LeConte.*)

Described from Illinois; not recorded elsewhere. The single type is in the Cambridge museum.

*Casey has applied the name "multifurcate" to these hairs. Champion calls them "radiato-pectinate" and states that they are present in *Læmorchestes*, some *Otidocephalus*, etc

Subfamily IX. OTIORHYNCHINÆ.

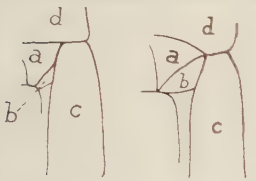
THE SHORT-SNOUTED WEEVILS. THE SCARRED SNOUT BEETLES.

A subfamily of medium size, found in all parts of the world, the principal distinguishing character of which is the presence of a round or oval depression resembling a scar on the front of each mandible. This is usually on the face of the mandible itself, but is sometimes borne at the tip of a projection of varying length. It marks the point of attachment during the pupal stage of a deciduous piece, rarely preserved in freshly emerged adults, which is usually elongate and slender, but sometimes short and conical. (Fig. 7.) Schwarz (1885, 29) says: "Specimens of *Epicærus imbricatus*, abundant early in spring under stones along the Potomac River, still possessed the mandibular appendages, thus showing that they were freshly hatched. One specimen illustrated the process of losing these appendages. They do not break off in one piece, but the basal third remains attached to the mandibles and must be lost at a later time." These pieces are probably used by the freshly matured insect to aid in cutting its way out of the pupal case and then, being of no farther use, are lost. According to Horn, the form of the mandible itself, without reference to the scar, indicates the occurrence of the deciduous piece. In those snout beetles, comprising the great majority of Rhynchophora, which have the mandibles acute at tip and one overlapping the other by an edge more or less acute, no deciduous piece or scar will be found. But in those in which the mandibles meet with a broad surface, and whose function is rather that of crushing than of cutting, the scar may be expected.

In addition to this mandibular scar the Otiorhynchids have the maxillæ usually concealed, their palpi short, rigid, 4-jointed; mandibles short, stout, pincer-like; beak short, broad, the antennal grooves usually well defined; antennæ strongly elbowed, inserted at the sides or top of the beak and always in front of its middle, 11-jointed (except in *Agraphus* and *Paragraphus*), the last three joints forming a compact annulated club; thorax with the apex usually truncate, the front margin of the sides often with ocular lobes; elytra entire, concealing the abdomen from above, the epipleuræ absent; abdomen with five ventral segments, the first two united, the others free; tibiæ straight or slightly curved; tarsal claws simple. The males have the pygidium transversely divided so that they possess eight dorsal abdominal segments, while the females have but seven.

The subfamily, as here treated, was founded as a family by

LeConte in 1874, the name being derived from two Greek words meaning "ear" and "snout." About 210 species have been described from this country, mostly from the Pacific slope or southwestern states, only 52 being known from the region east of the Mississippi River. Many of them are prettily ornamented with minute scales which resemble those on the wings of butterflies. They occur for the most part on or close to the ground, the larvæ of a number of species being destructive to the roots of various plants, while others are harmful to vegetables and fruits.



A.

Fig. 43. A, side pieces of mesosternum in Division I, *a*, episternum; *b*, epimeron; *c*, margin of elytra. B, same of Division II, *a*, episternum; *b*, epimeron; *c*, margin of elytra. (After Bedel.)

Based upon the size and shape of the side pieces of the meso- and metasterna, the subfamily was divided by Horn into two primary divisions as follows:*

KEY TO DIVISIONS OF OTIORHYNCHINAE.

a. Side pieces of mesosternum very unequal in size, the front one or episternum large and in direct contact with the margin of elytra, the epimeron small (Fig. 43, A.); sides piece of metasternum usually very narrow, sometimes entirely concealed by the elytral margin, its front end never broadly dilated on both sides. DIVISION I, p. 97.

aa. Side pieces of mesosternum diagonally divided and nearly equal in size so that the episternum does not reach the margin of elytra, being shut off by the epimeron (Fig. 43, B); side piece of metasternum moderately wide, its front end dilated and projecting inward between the epimeron of the mesosternum and the main body of the metasternum. DIVISION II, p. 116.

When the mesosternal epimera are intermediate in size there may be difficulty in assigning the specimen correctly to Division I or II. Horn appears to have referred most of these doubtful cases to Division II. In the Biologia the contrary course is adopted because such forms are usually apterous. *Pantamorus* (including *Aramigus* and *Phaeopholis*) will therefore be found in Division II, although in the Biologia it is suggested that they probably agree with the apterous group Sciaphilina, while Horn's group Artipi would even fall into the tribe Epicærini.

Division I. Otiorhynchinæ Apteræ.

In addition to the characters above given, our members of this Division all have the antennæ strongly elbowed; mentum

*A different classification of the subfamily has been recently published by Pierce (1913, 372—426), based principally on characters pertaining to the ocular lobes and antennal grooves or scrobes. A key to the genera following this system will be found on page 135. The student should check his determination of the genus by using this key in addition to the ones that follow, which are based upon those of Dr. Geo. H. Horn, and, except as noted, agree also with the classification adopted by Sharp in the Biologia.

large entirely concealing the maxillæ; inner wings rudimentary and metanotum membranous (characters which cannot be seen without breaking up the specimen); elytra without prominent shoulders and exposed portion of scutellum very minute. Three of the four tribes recognized by Horn are represented in the Eastern United States.

KEY TO EASTERN TRIBES OF DIVISION I.

a. Thorax without either ocular lobes or fringe of hairs (vibrissæ) on the front margin of its sides; eyes usually rounded and not partly covered.

b. Antennal grooves rather long, located on sides of beak and directed very obliquely downwards. Tribe I. BRACHYDERINI, p. 98.

bb. Antennal grooves short, usually located on upper surface of beak, or if on sides, directed toward the eyes.

Tribe III. OTIORHYNCHINI, p. 108.

aa. Thorax with ocular lobes or fringe of hairs more or less distinct and sometimes partially covering the eyes. Tribe II. OPHRYASTINI, p. 101.

At this point the Biologia may be quoted: "There are some species in which it is difficult at first sight to determine whether ocular lobes are present or not; but in such cases the form of the eye will determine the point, it being more or less longitudinal in the greatest diameter when lobes are present, and transverse when they are absent."

Tribe I. BRACHYDERINI.

Our members of this tribe have the beak at least as long as head, slightly dilated and notched at tip; front flat; scape of antennæ seldom reaching beyond middle of eye; elytra oval, but little if any wider at base than thorax; front coxæ contiguous, middle ones feebly separated; third joint of tarsi wider than second and deeply bilobed. The tribe is nearly equivalent to the Group Epicærina of the Biologia, the definition of which is "apterous Otiorhynchinæ without ocular lobes to the thorax, and in which the scrobes are entirely lateral, with their lower border arcuate to a greater or less extent. The scapæ of the antennæ is always moderate in thickness, the corbels of hind tibiæ somewhat cavernous."

KEY TO EASTERN GENERA OF BRACHYDERINI.

a. Antennæ scaly, body beneath densely scaly; tarsal joints pubescent, the claws free. I. EPICÆRUS.

aa. Antennæ shining, sparsely hairy; body beneath nearly naked.

b. Suture separating second ventral from first straight; tips of hind tibiæ open and surrounded by a single row of spinules.

II. HORMORUS.

bb. Suture separating first and second ventrals curved; tips of hind tibiæ partly enclosed, surrounded by a double row of spinules. III. BARYNOTUS.

I. EPICÆRUS Schön., 1834. (Gr., "upon" + "fit time.")

Rather large, robust species having the beak stout, longer than head, which is not constricted behind the eyes; support of deciduous piece of mandible short, conical and truncate; antennal grooves deep, very oblique; joints of funicle conical, the last distant from club; articular faces of hind tibiæ glabrous; tarsi pubescent. Males with the body more cylindrical, elytra not inflated, thorax broadest at middle, apical declivity of elytra straight or convex; females with abdomen and elytra inflated, thorax broadest at base, apical declivity generally concave.

KEY TO EASTERN SPECIES OF EPICÆRUS.

a. Frontal fovea round, not merging into a sulcus; beak smooth on median line but with two broad sulci at sides; elytra of male distinctly longer than wide; larger, 7.5 or more mm. 126. IMBRICATUS.

aa. Frontal fovea elongate, merging into median sulcus of beak; elytra but slightly longer than wide at the middle; smaller, not over 6.5 mm. 127. FORMIDOLOSUS.

126 (8233). EPICÆRUS IMBRICATUS Say, 1824, 317; ibid, II, 178.

Robust, more or less elongate, pyriform. Surface, when fresh, densely clothed with small grayish and fuscous scales, the pale ones usually forming a median stripe on thorax, the dark ones arranged to form three irregular bands—subbasal, submedian and subapical—across the elytra, the scales on under surface and legs nearly white. Beak smooth on median line, sulcate each side; front with a small round fovea. Thorax subcylindrical, not wider at base than middle, narrowed in front, disc with coarse, deeply impressed punctures, usually hidden by the scales. Scutellum small, triangular. Elytra with rows of large round, deep punctures which are almost as wide as the intervals. Length 7.5—11.5 mm. (Fig. 44.)

Three in Stein collection labelled "Indiana" are probably from Posey County. Flatbush, N. Y.; rare near New York City. Ranges from New York, New Jersey and Michigan west and south to Colorado and Texas. Known in economic literature as the "imbricated snout-beetle," and recorded by Chittenden (1899-a, 62—67) as attacking the foliage of young apple trees, potatoes, onions, cabbages and many other vegetables also clover and grasses. The best

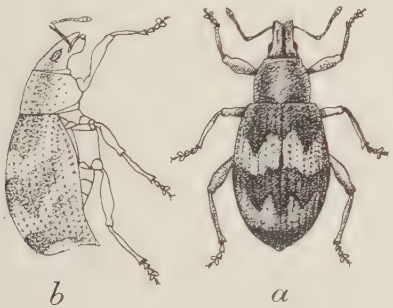


Fig. 44. *a*, Female; *b*, same from side. × 3. (After Chittenden.)

remedies are arsenicals, as Paris green, applied either dry or in spray at the rate of a pound to one hundred gallons of water; or, as the beetles feign death when disturbed, they may be readily jarred from the plants into vessels and then destroyed.

127 (8234). Epicærus formidolosus Boh., Schön., 1842, 284.

Ovate, pyriform. Piceous, everywhere densely clothed with fuscous and pale ash gray scales, the latter forming numerous irregular blotches on the elytra, or sometimes bands as in *imbricatus;* antennæ pale reddish-brown. Front with elongated fovea; funicular joints 3—6 almost as wide as long. Thorax conical, wider at base than long, disc sparsely and deeply punctate. Elytra broadly oval, strongly convex, conjointly but little longer than wide at the middle; striæ with rows of small, rather distant punctures; intervals each with a row of very short semi-erect scale-like hairs. Length 4—6.5 mm.

Lake Poinsett, Hillsboro County, Fla., May; Jacksonville, Punta Gorda and Lakeland, Fla., November. Known also from Alabama and Georgia.

II. Hormorus Horn, 1876. (Gr., "funiculus.")

In this genus the beak is longer and narrower than head, broader at tip, which is acutely emarginate and bears a V-shaped elevated line; antennæ rather long, scape reaching middle of eye, funicle 7-jointed, joints 3—7 obconical, club oval, acute; scutellum invisible; elytra oblong-oval, slightly wider at base than thorax; side pieces of metasternum almost wholly covered by elytra; second ventral of male one-half longer than third, of female as long as third and fourth united.*

128 (8237). Hormorus undulatus Uhler, Proc. Phil. Acad. Nat. Sci., 1855, 416.

Elongate-oval, robust. Dark brown, sparsely clothed with pearly-white scales and prostrate scale-like hairs, the former arranged in a narrow line along the side margin of thorax and forming a humeral lunule and an irregular patch on each side of declivity of elytra. Head and beak as long as thorax, rather densely punctured. Thorax oboval, slightly longer than wide, broadest in front of middle, apex truncate; disc densely covered with minute rounded tubercles and with a distinct median impressed line. Elytra with striæ of large, deep, closely placed punctures, intervals narrower, covered with small granules. Under surface densely punctured and with a patch of pearly scales each side of metasternum. Male more slender, with first and second ventrals broadly impressed at middle. Length 7.5 mm.

Not yet recognized in Indiana but undoubtedly occurs, as it is recorded from Illinois, Michigan, and Cincinnati, Ohio. Staten

*Pierce's key, stating that the "three intermediate segments of the abdomen are equal" in his Tribe Blosyrini, is erroneous in so far as it relates to this genus.

Island and Flatbush, N. Y.; Ramsey and South Orange, N. J.; Red Rock, Pa., June to September; Ithaca, N. Y., June 15; West Roxbury, Mass., May 5. Ranges from New England and Montreal, Canada, south and west to Washington, D. C., and Iowa. Smith records it as occurring very rarely beneath stones in early spring and Dury states that the two specimens secured at Cincinnati were taken by sweeping weeds in a cemetery. Each tubercle of thorax has a small central puncture bearing a prostrate golden hair. One of the most handsome of snout beetles.

III. Barynotus Germ., 1817. (Gr., "heavy" + "back.")

Rather large robust species having the beak stout, subcylindrical, longer and slightly narrower than head, deeply sulcate above; antennal grooves deep, slightly curved, passing immediately beneath the eyes; scape reaching middle of eye, joints 1 and 2 of funicle subequal, longer than the others, joint 3 conical, 4—7 rounded; femora club-shaped; tarsi pubescent beneath, claws free.

129 (8236). Barynotus schœnherri Zetterst., 1828, 187.

Oblong-ovate. Piceous, above densely clothed with pearly-gray scales, which are mixed on the elytra with cupreous and greenish ones. Head and beak as long as thorax, coarsely, deeply and sparsely punctured. Thorax subquadrate, widest at middle, apex truncate, base broadly curved, disc deeply and coarsely punctured with finer punctures intervening, more coarsely at sides, median line finely impressed. Elytra oval, moderately convex, slightly broader at base than thorax; striæ with rows of rather coarse punctures; intervals wide, feebly convex, each with a row of short, pale inclined setæ. Body beneath sparsely pilose, coarsely, densely and deeply punctured. Length 8.2—8.7 mm.

A European species which has been found in Newfoundland and at St. John, New Brunswick, in July; at Sydney, Nova Scotia, in August, from beneath logs or driftwood near ballast heaps. Single specimens have also been taken at Wales, Me., June 19, and Framingham, Mass., May 21.

Tribe II. OPHRYASTINI.

In our members of this tribe the beak is subcylindrical, not sulcate above; antennæ with scape at least reaching the eye, funicle 7-jointed; eyes narrow, oval or acute below, partially or not concealed by the ocular lobes; second ventral segment with its front suture straight; third tarsal joint deeply bilobed and wider than second.

KEY TO EASTERN GENERA OF OPHRYASTINI.

a. Antennal grooves on sides of beak not visible from above; second ventral segment not longer than the two following united.

b. Grooves deep, well defined, moderately curved and passing immediately beneath the eyes; punctures of elytral striæ not closed by scales. IV. ANAMETIS.

bb. Grooves gradually disappearing behind, badly defined, very feebly curved and directed toward the lower angle of the eye; punctures of elytral striæ each closed by a large scale. V. PANSCOPUS.

aa. Antennal grooves plainly visible from above, not directed beneath and not reaching the eyes; second ventral longer than the two following united. VI. PHYXELIS.

IV. ANAMETIS Horn, 1876. (Gr., "upon" + "counsel.")

Beak longer and narrower than head, its nasal plate triangular, concave, sharply defined by a distinct rim; front convex, separated from the beak by a transverse groove; scape gradually clavate; joints 1 and 2 of funicle elongate, 3—7 obconical, club elongate-oval; eyes transversely oval and obtuse beneath; postocular lobes very short, with a slight fringe of hairs; scutellum very small, triangular; elytra oval, truncate at base; humeri obsolete; second ventral segment as long as the two following united, its front suture straight.

KEY TO EASTERN SPECIES OF ANAMETIS.

a. Scape of antennæ reaching middle of eye, strial punctures of elytra fine, almost hidden by scales; first and second joints of funicle equal. 130 GRANULATUS.

aa. Scape of antennæ barely reaching the front of eye; strial punctures very coarse, deep, plainly visible; second joint of funicle distinctly longer than the first. 131. SETOSUS.

130 (8258). ANAMETIS GRANULATUS Say, 1831, 12; ibid, I, 273.

Oval, robust. Dark brown, densely and uniformly covered with grayish scales, many of which have a pearly reflection; antennæ and tarsi reddish-brown. Head and beak together as long as thorax, the beak convex with a fine submarginal impressed line each side. Eyes subconvex, coarsely faceted. Thorax slightly wider than long, widest at middle, base and apex truncate, sides feebly rounded, disc convex, its sculpture wholly concealed by the scales. Elytra oval, convex, sides parallel on basal half; discal striæ fine, marked with small, deep punctures; intervals nearly flat, each with two irregular rows of setæ. Length 5—7 mm.

Warren, Marion and Posey counties, Ind., frequent; probably throughout the State; May 23—July 28. Beaten from foliage of buckeye and other trees and shrubs. Portage, N. Y., May 24. Ranges from Newfoundland, Ontario and Quebec, Canada, and Wisconsin, west and south to Wyoming and Texas. Say's description is inadequate and the insect was redescribed by Horn as *Anametis grisea*, which name it bears in the Henshaw Cata-

logue, and probably in most collections, though changed in the Third Supplement to the Catalogue. It has been recorded by Riley (1882, 916) as damaging young peach, pear and apple trees, the beetles hiding near the surface of the ground in daytime and eating the bark and buds in places at night and has lately been troublesome in New York State. (*Parrott.*) Hamilton also notes its occurrence on the great ragweed, *Ambrosia trifida* L.

131 (——). Anametis setosus sp. nov.

Oblong-oval, convex. Black, densely clothed with dark brown and pearl-gray scales, the latter more conspicuous on the head, forming a ring about each eye and often a narrow median stripe on head and beak, covering the under surface and forming a narrow median and indistinct lateral stripes on thorax and a few remote scattered spots on elytra; antennæ, tibiæ and tarsi dark reddish-brown. Eyes small, almost flat, widely separated, finely faceted. Beak at base narrower than head and separated from it by a broad deep, transverse depression. Thorax subglobose, widest at middle, slightly wider than long, sides feebly rounded; disc densely covered and roughened by small scaly tubercles, each of which bears a short, suberect, clavate bristle. Elytra at base scarcely as wide as thorax, sides parallel to behind middle, thence converging to the subacuminate tips; strial punctures large, round, distant; intervals convex, each with a single row of short, inclined setæ. Length 6—6.5 mm. (*W. S. B.*)

Described from five specimens taken in Lake, Vigo and Posey counties, Ind., April 21—July 11. St. Louis, Mo., July 7. Swept from foliage of the iron-weed, *Vernonia fasciculata* Michx. While the preceding species is now commonly accepted as Say's *granulata*, it is our opinion that the present one fits his original description of that species much more accurately. Both occur in Posey Co., where New Harmony is located, and the types of *granulata* doubtless came from there. In the absence of these types the question cannot be settled. Should specimens which he sent out under the name of *granulata* come to light and prove identical with *setosus*, the name *grisea* Horn will have to be reapplied to the preceding species.

V. Panscopus Schönh., 1842. (Gr., "all-seeing.")

Beak stout, usually separated from the head by a distinct curved depression, its tip strongly emarginate and obtusely carinate; antennal grooves deep in front but disappearing before reaching the lower angle of the eyes; scape of antennæ not reaching hind border of eyes; club oval, acute; eyes transversely oval, obtusely pointed beneath; ocular lobes short but broad; scutellum very small; metasternum short, its side pieces indistinct;

second ventral segment equal to or slightly shorter than the third and fourth combined.

Horn recognized one species, *crinaceus* Say, as belonging to the genus. Pierce has recently (1913, 390) combined the genera *Phymatinus* and *Nocheles* Lec., and *Nomichus* Casey, placing them as subgenera under *Panscopus*. By erecting two new subgenera and describing seven new species, he thus brings under *Panscopus* 13 species, four of which are known from our territory. In addition we herewith describe another species which he does not include in his table.

KEY TO EASTERN SPECIES OF PANSCOPUS.

a. Articular surfaces of the hind tibiæ oblique, the corbels open.

b. Alternate elytral intervals distinctly elevated; median line of thorax strongly impressed on apical half.

c. First two joints of funicle elongate, the others moniliform; even elytral intervals with a few setæ near apical declivity. 132. ERINACEUS.

cc. All joints of funicle longer than broad; even elytral intervals without setæ. 133. ALTERNATUS.

bb. Alternate elytral intervals not elevated, all the intervals setose; median line of thorax very feebly impressed along its entire length; elytra ovate, strongly ventricose. 134. MACULOSUS.

aa. Articular surfaces of hind tibiæ terminal, almost enclosed, the corbels cavernous.

d. Alternate elytral intervals elevated and setigerous, the even intervals without setæ; beak longer than head, carinate. 135. IMPRESSUS.

dd. Alternate elytral intervals not conspicuously elevated, all intervals setigerous; beak not much longer than head, broad, carinate. 136. CARINATUS.

132 (8261). PANSCOPUS ERINACEUS Say, 1831, 11; ibid, I, 272.

Oblong, moderately robust. Body above densely covered with dark brown and pearly or silvery scales, the latter forming a narrow median line on thorax and lateral stripes on its basal half, and a few small scattered irregular pale spots on elytra. Beak one-half longer and as broad as head, indistinctly carinate and with numerous coarse deep seta-bearing punctures; front deeply concave between the eyes, which are subconvex, coarsely faceted; scape reaching almost their middle. Thorax subglobose, at middle one-third wider than long, apex and base truncate, sides broadly rounded; disc convex, its surface without tubercles, the median line distinctly impressed in front of middle. Elytra oblong-oval, base truncate, scarcely as wide as middle of thorax, humeri indistinctly subangulate; disc striate, the striæ marked with rather large, distant punctures, each of which is closed by a rounded pearly scale; alternate intervals strongly convex and with a row of long inclined setæ; even ones flat. Under surface sparsely covered with pearly scales. Length 6—7 mm.

Staten Island, N. Y., May 31—July 8. Framingham, Mass., April 19, one specimen. (*Frost.*) Horn gives its range as Canada to Pennsylvania. Pierce states that the specimens in the U. S. Museum collection are from New Hampshire; Buffalo, N. Y., Washington, D. C.; Maryland and Virginia. Smith records it as occurring in New Jersey in salt meadows in March and on wild grape in June and July. LeBaron states that he took *P. erinaceus* abundantly in Michigan under the chips placed as traps for the plum curculio, but his specimens may have been *P. maculosus* below described or one of Pierce's new species.

133 (——). PANSCOPUS ALTERNATUS Schæff., 1908, 214.

Form and color of *erinaceus;* body more slender. Beak narrower, finely carinate behind the antennæ. Funicle longer, all its joints, especially 1 and 2, more slender. Thorax shorter, its disc densely covered with small rounded tubercles, each bearing a suberect seta. Elytra less convex, the alternate intervals more strongly elevated than in any of the other species, the flat ones wholly without setæ. Length 6—7 mm.

Round Knob and Balsam, N. C., June 24—July 8; beaten from oak. Black Mountain, N. C., by sifting old leaves in September. Pineville, W. Va., found by sifting. Clayton, Ga., June.

134. (——). PANSCOPUS MACULOSUS sp. nov.

Oblong-ovate, robust. Color of *erinaceus*, the brown scales paler, the silvery ones more abundant on head and beak and forming entire lateral stripes on thorax and numerous irregular spots on elytra. Beak twice as long and distinctly narrower than head, finely carinate; front with a narrow linear fovea between the eyes. Scape slender, passing the middle of eyes; joints 1 and 2 of funicle elongate, equal, 3—7 obconical, slightly longer than wide. Thorax one-third wider than long, sides strongly rounded, disc with a faint median impressed line, densely covered with small, rounded, scaly tubercles, each of which bears a short pointed, prostrate yellowish hair. Elytra oval, slightly wider at base than thorax, humeri rounded, sides parallel only on median third; striæ wide, concave, marked with large, round, distant punctures, each filled with a round, pale scale; intervals narrower than the striæ, feebly and equally convex, each with a row of rather long, inclined yellowish setæ. Length 5.5—7.5 mm. (*W. S. B.*) (Fig. 45.)

Fig. 45. × 9. (Original.)

Lake, Vigo and Posey counties, Ind., scarce; April 18—June 5. Fort Montgomery, N. Y., May 31. Washington Co., N. Y. Taken from bitter-sweet (*Celastrus scandens* L.) and by sweeping. Easily distinguished from the two preceding by its more robust form, paler color, longer scape and longer and narrower beak.

135 (——). PANSCOPUS IMPRESSUS Pierce, 1913, 395.

"Black, very densely clad with æneous to yellowish-brown scales with intermixed setæ. Scrobes deep, visible from above in entire length; scape densely squamose, not reaching posterior margin of eye; funicular joints elongate, shining. Thorax wider than long, apically sinuate, basally truncate, laterally strongly convex, widest slightly before middle; median line widely impressed; surface very rough with setigerous tubercles which are completely hidden by the scales. Elytra with sides convex, wider than thorax, intervals wider than striæ. Undersides very densely squamose. First abdominal suture angulate at middle. Length 8.5—9.5 mm."

The above are the salient points of the original description by Pierce, other than those given in the key. Described from three specimens in the U. S. Nat. Mus. from Stone Creek, Lee County, Virginia, and a single specimen labeled Indiana. Dury reports sweeping it from weeds in low damp woods near Cincinnati, Ohio, in June.

136 (——). PANSCOPUS CARINATUS Pierce, 1913, 398.

"Piceous, densely clothed with yellowish and brownish æneous, striate scales and sparsely setose with brown bristles. Beak longer than head, separated from the latter by a broad, deep, arcuate impression, strongly carinate and with a large apical, triangular, glabrous, punctate area containing the nasal plate. Scrobes deep, visible from above in entire length, evanescent near eyes; scape reaching middle of eye, funicle elongate, sparsely setose, all joints longer than wide. Thorax wider than long, apically emarginate, basally truncate, laterally broadly convex, constricted behind apex; surface covered with setigerous tubercles and densely squamose. Elytra over one-half longer than wide; intervals convex; striæ not impressed, punctures round, each filled with a round scale; underside densely clothed with lighter scales. Length 7 mm."

Described from two specimens from Detroit, Michigan.

VI. PHYXELIS Schönh., 1843. (Gr., "wandering.")

Beak stout, one-half longer than head, its tip deeply emarginate; antennal grooves short, visible from above, strongly curved, not reaching the eyes; scape gradually clavate, reaching hind margin of eye; joints 1 and 2 of funicle longer than the others, which are rounded or obconic; thorax short, broader than

long, its apex and base truncate; scutellum invisible; elytra strongly convex and with rows of setæ. Two species represent the genus in the Eastern United States, one of which is herewith described as new.

KEY TO EASTERN SPECIES OF PHYXELIS.

a. Second joint of funicle scarcely longer than first; beak distinctly narrower than head, separated from the latter by a feeble transverse impression. 137. RIGIDUS.

aa. Second joint of funicle two-thirds longer than first; beak as broad as head, separated from the latter by a strong transverse impression. 138. LATIROSTRIS.

137 (8281). PHYXELIS RIGIDUS Say, 1831, 11; ibid. I, 272.

Short, ovate, robust. Piceous brown, rather densely clothed with small grayish scales and usually thickly coated with a dirty brown or yellowish waxy crust; funicle, club and tarsi reddish-brown. Beak and head densely covered with minute grayish scales, the former often with a narrow median sulcus. Thorax, one-fourth wider than long, sides slightly curved, ocular lobes small; disc with a faint median impressed line, densely scaly and bearing numerous short scattered setæ arising from minute tubercles. Elytra broadly oval, base truncate, not wider than middle of thorax; disc feebly striate, the striæ marked with large punctures, intervals feebly convex, each with a single row of rather long, coarse, inclined yellowish setæ. Length 3.5—4.5 mm.

Lake, Kosciusko, Putnam and Marion counties, Ind., scarce; March 17—June 3. Taken by sifting. The earlier date indicates that with us it hibernates as imago, and Chittenden states (1890, 167) that in New York it "hibernates under piles of weeds and rubbish in fields and gardens where it may be found early in spring and late in autumn." Common under stones in spring near New York City; on herbage, May—July. Ranges from Canada, New England and Michigan west and south to Iowa, North Carolina and Georgia. *P. glomerosus* and *setiferus*, described respectively from Boston and New York by Boheman, are treated as synonyms of *rigidus* by Horn, and we can find no definite characters in the descriptions separating them from that species or from one another.

138 (——). PHYXELIS LATIROSTRIS sp. nov.

Short, ovate, more robust than *rigidus*. Piceous-black, above densely clothed with small grayish and fuscous scales, the waxy coat less evident on elytra; femora and tibiæ dark reddish brown; antennæ and tarsi paler. Beak slightly longer but not narrower than head, densely covered with a yellowish waxy coat, its disc flat, with a slight median ridge and a broad transverse depression at base. Scape proportionally stouter and shorter

than in *rigidus*, scarcely reaching the hind border of eye, the latter distinctly larger and more coarsely granulate than there. Thorax subglobose, as wide as long, sides distinctly rounded; disc densely covered with large rounded obtuse tubercles, each of which bears a small inclined pale hair, the median impressed line distinct. Elytra oval, widest at middle, suddenly narrowed on apical fourth; disc distinctly striate, the striæ with rows of large rounded punctures; intervals convex, setose as in *rigidus*, the setæ more prominent on apical half. Under surface sparsely clothed with small scales; femora and tarsi with numerous short setæ. Length 4.5—5.5 mm. (*W. S. B.*)

Crawford and Harrison counties, Indiana. Five specimens taken May 28—June 24, from beneath chunks and stones in high, dry open woods. A larger and more convex species than *rigidus;* the beak distinctly broader and with much more evident transverse groove at base; thorax more globose and with the tubercles of its surface much more prominent. It is evidently a species of southern range, as both the counties in which it has been found border on the Ohio River.

Tribe III. OTIORHYNCHINI.

In this tribe the antennæ are rather long, the scape always reaching beyond the eyes; beak short, its antennal grooves never linear and at the same time directed obliquely downward; elytra striate, the striæ entire; side pieces of metasternum usually entirely concealed by the elytra.

KEY TO EASTERN GENERA OF OTIORHYNCHINI.

a. Funicle 6-jointed; basal joint of antennal club very large.

b. Intervals of elytra with very short almost invisible setæ; antennal club oval; thorax without median sulcus; articular surface of hind tibiae enclosed, their tips truncate with a broad oval space. VII. AGRAPHUS.

bb. Intervals each with a row of prominent club shaped setæ; club oblong; thorax with a deep median groove; articular surface of hind tibiæ open, their tips not truncate. VIII. PARAGRAPHUS.

aa. Funicle 7-jointed; articular surface of hind tibiæ free, the corbels open; basal joint of antennal club not greatly enlarged.

c. Tarsal claws free.

d. Outer joints of funicle longer than wide, obconical; eyes without orbital groove.

e. Metasternal side pieces entirely concealed by the elytra, the suture obsolete; hind tibiæ with two short fixed spurs; length 5 or more mm. IX. OTIORHYNCHUS.

ee. Metasternal side pieces moderately wide, the suture distinct; hind tibiæ without terminal spurs; length not over 4 mm. X. NEOPTOCHUS.

dd. Outer joints of funicle short, rounded, moniliform; eyes with distinct orbital groove.

f. Side pieces of metasternum wholly concealed; both front and middle tibiæ spined at apex.

g. Antennal grooves on upper surface of beak very short and deep, not reaching the eyes; spine of front and middle tibiæ feeble. XI. CERCOPEUS.

gg. Antennal grooves on sides of beak long, passing directly backward and enclosing the eyes; tibiæ strongly spined at apex. XII. CHÆTECHUS.

ff. Side pieces of metasternum visible; only the front tibiæ spined at apex. XIII. TRACHYPHLŒUS.

cc. Tarsal claws connate; scape nearly as long as funicle, the latter with outer joints longer than wide; antennal grooves on the sides not converging above and not reaching the eyes. XIV. GEODERCES.

VII. AGRAPHUS Say, 1831. (Gr., "without" + "marking.")

In addition to the characters above given the single member of this genus has the scape reaching the thorax, longer than the funicle and club, the latter oval, slightly flattened, composed in great part of the first joint only; beak longer and narrower than head, with an oblique constriction at base; antennal grooves deep in front, broadly open and shallow behind, enclosed by an elevated rim; eyes small, oval, oblique, pointed in front; scutellum small, triangular; elytra very convex, oval, slightly pointed behind; tarsi slender, three-fourths the length of tibiæ, third joint scarcely wider than second, feebly emarginate; claws free.

139 (8282). AGRAPHUS BELLICUS Say, 1831, 13; ibid, I, 274.

Elongate-oval. Black, densely covered with grayish scales, which in places are faintly dusky. Thorax oval, broader than long, truncate at apex, broadly curved at base, disc sparsely and rather coarsely punctured. Elytra not wider at base than thorax, their striæ fine, with rows of distant punctures; intervals feebly convex, each with a double row of minute, semiprostrate hairs. Length 6.5—8.5 mm.

Rockaway and Babylon, N. Y., June to September. Crescent City, Capron, Tampa, Dunedin and Cedar Keys, Fla., March 25—June 29; one specimen and numerous fragments taken on the former date from the axils of the leaves of the yellow thistle, *Carduus spinosissimus* Walt. Horn gives its range from "Pennsylvania to Florida," so that it is likely to occur in southern Indiana. Smith records it from New Jersey as always rare.

VIII. PARAGRAPHUS gen. nov. (Gr., "near" + Agraphus.)

This genus is based upon a single robust ventricose species having, in addition to characters given in key, the antennal scape stout, curved, scarcely reaching the thorax, first and third joints

of funicle each half the length of second, 4—6 not longer than third, gradually slightly wider; basal joint of club oblong, nearly as long as the three preceding united, two outer joints of club very small, almost wholly concealed; beak shorter than head, separated from the latter by an oblique constriction, its antennal grooves much as in *Agraphus*, the rim of the cavity less elevated; femora unarmed; corbels of hind tibiæ cavernous, the outer edge lengthened and curved; tarsi narrow, shorter than in *Agraphus*, the third joint not bilobed; claws simple, widely separated. (*W. S. B.*)

140 (——). PARAGRAPHUS SETOSUS sp. nov.

Oval, robust, pointed behind. Piceous; above thickly clothed with very small oval, seal-brown and silvery-gray scales, the latter forming a small spot each side of base of thorax, and on elytra an irregular stripe extending along second and third intervals from base to declivity, also on sides a broader irregular one of loosely placed scales from humeri to apex; under surface and legs thickly clothed with silvery- or dirty-gray scales, the femora and tibiæ annulate with brown. Head with a shallow median groove, deeper between the eyes. Thorax subcylindrical, scarcely longer than wide, widest just in front of middle; disc uneven, with a wide deep median groove each side of which is a broad, shallow impression near base. Elytra oval, inflated, distinctly pointed behind; base scarcely wider than middle of thorax; humeri wanting; sides broadly rounded from base to apical third then strongly converging to apex; striæ fine, indistinctly punctate; intervals feebly convex. Length 6.2 mm. (*W. S. B.*)

Described from a single specimen taken Feb. 18, 1916, from the leaf axils of the thistle, *Carduus spinosissimus* Walt, growing within 50 yards of the Gulf beach on Hog Island, opposite Dunedin, Fla. The suberect clavate brown setæ are prominent along the intervals of elytra as well as on the sides of thorax.

IX. OTIORHYNCHUS Germ., 1824. (Gr., "ear" + "snout.")

This genus is represented in North America by six species which are common also to Europe. Four of the six occur in the Eastern United States, though but one has been taken in Indiana. They have the beak as long as head, more or less dilated and notched at tip, the antennal grooves on upper surface deep; antennæ rather long, the scape passing slightly the front margin of thorax, the club oval, acute at tip; eyes rounded or slightly oval; scutellum very small; tarsi dilated, spongy pubescent beneath, the third joint deeply bilobed; second ventral segment shorter than the two following combined, separated from the first by a curved suture.

KEY TO EASTERN SPECIES OF OTIORHYNCHUS.

a. Hind femora distinctly toothed.
b. Beak sulcate, its tip with a bifid carina; elytra sulcate; femoral tooth very small, acute. 141. SULCATUS.
bb. Beak not sulcate, its tip not carinate; elytra not sulcate; femoral tooth large. 142. OVATUS.
aa. Hind femora not or very minutely toothed.
c. Upper surface without scales. 143. RUGIFRONS.
cc. Upper surface rather thickly clothed with silver-gray scales. 144. SINGULARIS.

141 (8283). OTIORHYNCHUS SULCATUS Fab., 1798, 155.

Oblong, brownish-black, subopaque. Thorax subcylindrical, not longer than wide, its surface densely covered with rounded tubercles, each bearing a short hair. Elytra oblong-oval, striæ coarsely punctured and with small remote patches of short yellowish hair; intervals feebly convex, each with a row of shining rounded tubercles. Femora strongly club-shaped, deeply sinuate near tip. Length 8.5 mm.

Ithaca, N. Y., March 22; Orono, Maine, April 2. Very abundant under fence rails at Cape Breton in July; found in many localities about New York City, April to August. Known from Newfoundland, New England and Toronto, Canada, to Vancouver, and therefore may occur in the Transition Life Zone of northern Indiana. Injurious in Europe, where it is called the "black vine weevil," to numerous horticultural plants, the larvæ feeding especially on the roots of strawberries and the beetles themselves on ferns and hothouse plants.*

142 (8284). OTIORHYNCHUS OVATUS Linn., 1761, No. 626.

Oblong-oval. Piceous, shining, antennæ and legs reddish brown. Beak flat, coarsely, closely and rugosely punctate; front with a deep oblong puncture. Thorax subglobose, base and apex truncate, disc with numerous elongate tubercles or ridges separated by deep grooves. Elytra oval, the striæ more distinct on the sides, marked with rows of large rounded punctures; intervals flat or feebly convex, they, as well as the ridges of thorax, bearing numerous short, yellowish, semi-prostrate hairs. Length 5—6 mm. (Fig. 46.)

Fig. 46, × 6. (After Forbes.)

Frequent throughout Indiana; April 15—August 26. Occurs beneath cover in dry or sandy localities. Locally common near New York City, June to Octo-

*Ins. Life, III, 37; IV, 222.

ber. Ranges from Newfoundland, New England and Ontario to Wyoming and New Mexico. Known as the "strawberry crown-girdler" and the "graveyard bug," the latter because it is said to have been introduced into New England in cemetery shrubbery. Injurious to strawberries and rarely to muskmelons, and sometimes found in houses in large numbers. *Otiorhynchus ligneus* Lec. is a synonym.

143 (8285). OTIORHYNCHUS RUGIFRONS Gyll., 1813, 319.

Closely resembles *sulcatus* but a little smaller and femora without tooth. Elytra more broadly oval, the humeri more oblique; striæ without the distant tufts of hair; intervals each with a double row of short hairs. Length 7.5—8 mm.

Fort Lee, New Jersey, under stones, May. Ithaca and Portage, N. Y., April 8—May 24. Known also from Quebec and Toronto, Canada, District of Columbia, Virginia and Pennsylvania, but not yet generally distributed in the states named.

144 (——). OTIORHYNCHUS SINGULARIS Linn., 1767, 1066.

Oblong-oval. Dark reddish-brown, head piceous, legs paler; above rather thickly clothed with round grayish and silvery scales; femora with a ring of similar scales before the apex. Beak very finely punctate near apex, not sulcate. Thorax as wide at middle as long, sides broadly rounded, base narrower than apex, disc as in *sulcatus*. Elytra oval, sides broadly curved; disc with rows of coarse, rather distant, punctures, each closed with a large rounded silvery scale. Length 6—8 mm.

Stoneham, Mass., May 20. Known also from Quebec. The hind femora bear a minute tooth, visible only under a strong lens. *O. picipes* Fab. is a synonym.

O. auricapillus Germ., a European species, has been found on imported nursery stock at Cromwell, Conn., but is not to be included until more frequently reported.

X. NEOPTOCHUS Horn, 1876. (Gr., "new" + "small.")

Our only species of this genus has the beak stout, cylindrical, flattened above, its tip widely emarginate; antennal grooves on the sides, deep in front, shallow and broad behind, reaching the eyes; antennæ long, scaly, inserted near tip; scape curved, passing the front margin of thorax; joints 1 and 2 of funicle long, 3—7 conical, gradually decreasing in length. Scutellum absent. Second abdominal segment as long as the two following, the first suture strongly curved at middle.

145 (8291). NEOPTOCHUS ADSPERSUS Boh., Schön., 1834, 486.

Oval, robust. Piceous, everywhere densely clothed with pale brown and ash-gray scales, the latter usually predominating, the brown ones sometimes covering in part the head, beak and thorax and forming a humeral

and scattered smaller spots on the elytra; antennæ and tarsi reddish brown. Beak not longer and as wide as head, sparsely punctured, broadly concave. Thorax short, cylindrical, nearly twice as wide as long, sides feebly curved, base and apex truncate, disc coarsely and sparsely punctate. Elytra broadly oval, strongly convex, not broader at base than thorax at middle, finely striate, striæ with fine distant punctures; intervals flat, each with a row of short, white, suberect bristles. Length 3.5—4 mm.

A compact and handsome little species known only from Georgia and Florida. Dunedin, Jacksonville, Gainesville, Sanford and Punta Gorda, Fla., Jan. 26—Nov. 14. Taken frequently at Dunedin in March and April by sweeping herbage and beating oak, and common in autumn on the heads of a yellow flowered Compositæ, *Helianthus debilis* Nutt.

XI. Cercopeus Schönh., 1843. (Gr., "deceitful.")

Beak slightly longer and narrower than head, feebly curved, truncate at tip; mandibular scar very feeble; scape reaching front margin of thorax; eyes small, rounded, surrounded by a distinct groove; elytra oval, slightly narrowed behind, humeri broadly rounded; front and middle tibiæ feebly mucronate; tarsal claws free.

146 (8305). Cercopeus chrysorhœus Say, 1831, 13; ibid., I, 274.

Oval, strongly convex. Dark reddish-brown, densely covered with minute, dirty yellow or pale brown scales; disc of elytra often with a large, darker, heart-shaped area; antennæ and tarsi pale reddish-brown; sides of thorax and basal half of elytra in fresh specimens with a narrow sinuous line of gray scales. Thorax semiglobose, slightly wider than long, apex and base truncate, sides strongly curved; disc densely punctured, the scales closing the punctures somewhat sparse. Elytral striæ very fine, feebly punctured; intervals flat, each with a single row of short inclined bristles. Length 3—5 mm.

Throughout Indiana but scarce; May 1—June 5. Taken by sifting and beneath chunks in dry localities. Cold Spring, N. J., April 14, under boards. Ranges from Massachusetts to Michigan, south and southwest to Georgia and Missouri. Probably hibernates as imago. Recorded as attacking wild and cultivated grapes and sometimes called the "grape curculio," but that name properly belongs to *Craponius inæqualis* Say.

XII. Chætechus Horn, 1876. (Gr., "setæ" + "to have.")

Here belongs also a single small species having the beak stout, quadrangular, its tip truncate; antennæ stout, inserted near its middle, scape reaching the thorax, joints 1 and 2 of funicle long, the first much stouter, 3—7 moniliform; scutellum indistinct; second ventral segment longer than either third or fourth, the first suture feebly curved.

147 (8306). CILETECHUS SETIGER Horn, 1876, 78.

Oval. Brownish, antennæ and tarsi paler; head and thorax rather densely, elytra very sparsely clothed with brown, scale-like hairs. Beak not longer than head, densely punctured and with a distinct impressed median line. Thorax oval, scarcely wider than long, widest at middle, disc convex, densely and finely punctured. Elytra oval, one-half wider at base than thorax, sides parallel to behind middle, thence gradually converging to a rounded apex; disc feebly striate, striæ with coarse punctures; intervals almost flat, each with a row of scale-like clavate hairs. Length 2—2.5 mm.

Known from eastern Massachusetts, May 19—August 29, where it is rare, and Nova Scotia, July. Our smallest species of the subfamily, easily known by its size, color and sparse scales.

XIII. TRACHYPHLŒUS Germ., 1817. (Gr., "rough" + "bark.")

Beak as long as head, stout, notched in front; antennæ inserted near its middle, their grooves deep, sharply limited, directed toward and almost reaching the eyes; scape reaching thorax; first joint of funicle longest, robust, second slender, 3—7 as broad as long, closely united; club small, oval; eyes very small, round, coarsely granulated and surrounded by a distinct orbital groove; scutellum invisible; middle tibiæ not mucronate; tarsal claws free. Two species are known from the Eastern United States, occurring in grassy places beneath stones.

KEY TO EASTERN SPECIES OF TRACHYPHLŒUS.

a. Beak with a deep transverse impression at base; body indistinctly scaly densely covered with a pale, clay-yellow coating. 148. ASPERATUS.

aa. Beak without impression at base; body distinctly scaly and without artificial coating. 149. DAVISI.

148 (8307). TRACHYPHLŒUS ASPERATUS Boh., Schön., 1843, Pt. I, 116.

Oval, moderately robust. Brown, densely covered with a pale brownish or yellowish waxy coat; elytra variegated with brownish spots. Thorax transversely oval, nearly twice as wide as long, apex truncate, base feebly, sides strongly curved; disc with median line and sides paler and with sparse, erect, scale-like hairs. Elytra oval, sides feebly curved, apex obtuse, disc striate; intervals flat, each with a single row of club-shaped scale-like hairs. Length 3 mm.

Boheman's type was from Boston. Recorded, doubtless in part erroneously, from Maine, Massachusetts, Missouri, Kansas and Nebraska. Horn says of it: "The rather deep impression at base of rostrum, together with the convexity of the rostrum below this, owing to its being slightly curved, give this insect a

very peculiar facies." This is true of the single example in the LeConte collection, which is probably the "one specimen from the Middle States," described by Horn. Boheman does not mention this impression, and his description differs in other respects from that of Horn, so that the status of the species is at present in doubt. It is not represented in the Horn collection at Philadelphia, while in the U. S. National Museum collection the specimens bearing the name "*T. asperatus* Boh." are the same as those described by Pierce (1910, 362) as *Lepidocricus herricki*.

149 (——). TRACHYPHLŒUS DAVISI sp. nov.

Oblong-oval, robust. Black, densely clothed with fuscous and silvery gray metallic scales, the latter forming a broad median and a stripe each side on thorax and covering the even elytral intervals, but on the third, fifth and seventh ones forming oblong spots which alternate with fuscous ones, thus giving the elytra a tessellated appearance; antennæ and legs dull reddish-brown. Beak stout, slightly shorter than thorax and with a distinct median groove. Thorax nearly twice as wide as long, sides strongly rounded; disc without median impressed line, its sculpture concealed. Elytra subglobose, but slightly wider at base than middle of thorax, humeri obsolete, sides feebly diverging to apical third, then broadly rounded to apex; striæ fine, indistinctly punctate; intervals flat, each with a row of very short, stout erect blackish setæ. Front tibiæ expanded at apex and provided with two short acute spines. Length 3.5—3.8 mm. (*W. S. B.*) (Fig. 47.)

Fig. 47. *Trachyphlœus davisi* sp. nov. × 9. Enlarged side view of head beneath. (Original.)

Several specimens taken by Wm. T. Davis from the sea beach near Fort Wadsworth, Staten Island, N. Y.; April 27, 1911. We take pleasure in naming it in honor of our mutual friend, the collector.

XIV. GEODERCES Horn, 1876. (Gr., "the earth"; "to appear like.")

Beak short, robust, subcylindrical, tip feebly emarginate; antennæ inserted in front of middle, scape long and slender, reaching beyond front margin of thorax, joints 1 and 2 of funicle longer than the others, 3—7 obconical, longer than wide; scutellum not visible; second ventral shorter than the two following united.

150 (8297). Geoderces melanothrix Kirby, 1837, 202.

Oval, robust. Chestnut brown, densely clothed with dirty brown scales, with a line on sides of thorax and short indistinct markings on elytra paler, the scales intermixed with very short, semi-erect sparsely placed blackish hairs; antennæ reddish-brown. Head and beak slightly longer than thorax, beak coarsely, sparsely punctate. Thorax oval, slightly wider than long, disc coarsely, sparsely and evenly punctate. Elytra oval, narrowed at base, subglobose, humeri oblique; disc with striæ of moderate punctures; body beneath coarsely punctured and sparsely scaly; legs densely covered with brownish scales, femora with a broad ring of whitish scales near the tip. Length 5.5—8 mm.

Ranges from Canada and New York to Lake Superior and Vancouver, B. C. A member of the Boreal and Transition Life Zones.

Division II. Otiorhynchinæ Alatæ.

The species of Division II are called Otiorhynchinæ Alatæ in the Biologia, though the wings are sometimes rudimentary even in a series of specimens of certain species (e. g. *Tanymecus confertus*) from the same locality. In addition to the characters of the key, the shoulders of the elytra are distinct and stand out more or less laterally, the tip of the scutellum separates the exposed bases of the elytra, and the metasternum is either elongate or short.

Of the metasternal episternum in this Division Horn (1876, 80) says: "It is usually moderately broad, the suture distinct in its entire length. In every case, however, the front end of the episternum is suddenly dilated, causing on one side an emargination of the elytral margin (which is, however, evanescent), while on the inner side an acute triangular process of varying length occupies a space between the mesosternal epimeron and the body of the metasternum." The mandibular scar is very distinct in all the genera and is usually on the face of the mandible itself, though sometimes at the summit of an obtuse process. Most of our members of the Division have the body proportionately more elongate and slender than those of Division I, but the form in *Sciaphilus* and *Strophosoma* is quite similar to that commonly observed in Division I. The five tribes recognized by Horn are represented in our territory .

KEY TO EASTERN TRIBES OF DIVISION II.

a. Thorax without ocular lobes (present but feeble in *Pachnæus*); mentum of moderate size, not retracted; eyes rounded or oval.

b. Thorax with a fringe of short bristly hairs on the front margin behind the eyes; elytral striæ ten. Tribe I. Tanymecini, p. 117.

bb. Thorax without fringe of hairs as above.

c. Cheeks emarginate behind the mandibles; elytral striæ nine, rarely ten, the tenth usually united with the ninth; tarsal claws free, except in *Aphrastus*. Tribe II. CYPHINI, p. 121.

cc. Cheeks not or very feebly emarginate; elytral striæ ten.

d. Beak longer than head, the antennal grooves long; tarsal claws free; head not prolonged behind the eyes; corbels of hind tibiæ cavernous. Tribe III. EVOTINI, p. 128.

dd. Beak not longer than head, the grooves short; tarsal claws connate; head prolonged behind the eyes; corbels of hind tibiæ open. Tribe IV. PHYLLOBIINI, p. 128.

aa. Thorax with large ocular lobes; mentum small, retracted; eyes transversely oval. Tribe V. PROMECOPINI, p. 133.

Tribe I. TANYMECINI.

Our members of this group have the beak of moderate length, its sides subparallel and tip emarginate; antennal grooves linear, rather deep, curved and passing beneath the eyes; scape moderately long, reaching at least the hind margin of eyes; scutellum distinct; second ventral segment longer than third and fourth together and separated from the first by a curved suture; tarsal claws free. Three of the four genera are represented in our territory.

KEY TO EASTERN GENERA OF TANYMECINI.

a. Front coxæ contiguous; front femora not longer and stouter than the others.

b. Thorax feebly lobed behind the eyes, its base bisinuate; eyes transversely oval, pointed beneath. XV. PACHNÆUS.

bb. Thorax not lobed, its base truncate; eyes longitudinally oval; front tibiæ not toothed within. XVI. TANYMECUS.

aa. Front coxæ distant; front femora larger than the others, their tibiæ toothed within. XVII. PANDELETEIUS.

XV. PACHNÆUS Schönh., 1826. (Gr., "pruinose.")

Beak as long as the head, antennæ inserted near its middle, scape reaching hind margin of eye, first two joints of funicle longer than the others, second longer than first, 3—7 subequal; elytra wider at base than thorax; humeri oblique. Two large and handsome species occur in the South Atlantic States.

KEY TO SPECIES OF PACHNÆUS.

a. Color pale blue or greenish-blue; elytra strongly bisinuate at base, the middle of each produced forward on the thorax. 151 OPALUS.

aa. Color pale bluish-white; elytra feebly bisinuate, not produced forward at base. 152. DISTANS.

151 (8309). PACHNÆUS OPALUS Oliv., 1807, 339.

Oblong-oval. Piceous; everywhere densely covered with pale blue scales having a faint cupreous lustre; median line and sides of thorax paler. Beak with a fine median carina. Thorax one-third wider at base than long, sides feebly curved to the narrower apex, base bisinuate, apex feebly lobed at

middle, disc finely and sparsely punctate, the median line slightly impressed. Elytra oblong-oval, base one-fourth wider than thorax, strongly bisinuate, the humeri ending in a small tooth-like prominence; disc not striate, but each elytron with twelve rows of small distant punctures; intervals each with two irregular rows of fine punctures bearing minute whitish bristles. Length 9—10.5 mm.

Recorded only from Florida where it has a wide distribution. Key West, April 6—July; Miami and Cape Sable, May. Schwarz, in his list of Florida Coleoptera, says "Northern and Middle Florida, not rare." Georgia; LeConte collection. Occurs mainly on citrus trees. Ashmead (1880, 61) states that it is injurious to the orange and on the keys of South Florida is found in large numbers feeding on the leaves of the lime, and also on those of the groundsel-tree, *Baccharis halimifolia* L., and the sea ox-eye, *Borrichia frutescens* L., and Schwarz (1889) states that it occurs more commonly on the various fig trees and all sorts of succulent weeds.

152 (8310). PACHNÆUS DISTANS Horn, 1876, 83.

Elongate-oval. Piceous; everywhere densely clothed with pale bluish-white scales; antennæ and tarsi reddish-brown. Head and beak as in *opalus*. Thorax subcylindrical, scarcely wider than long, sides nearly parallel, base bisinuate; disc with large, deep, scattered punctures. Elytra oblong, sides feebly curved, tips separately acute; disc punctate as in *opalus*, the punctures deeper and coarser; intervals flat. Length 8—14 mm.

Known from Manumuskin, N. J., Wilmington and Southern Pines, N. C., and various points in north and central Florida. Ormond, Apr. 11—14; Bartow, July 16. Occurs on pine and oak.

XVI. TANYMECUS Germ., 1817. (Gr., "stretch.")

Beak as long as head, flattened above. Joints 1—2 of funicle longer, sub-equal; 3–7 obconical, gradually shorter; eyes oval; scutellum small, triangular; surface densely scaly.

KEY TO SPECIES OF TANYMECUS.

a. Larger, 8–9 mm.; beak feebly emarginate at tip, not carinate above; scape reaching the front margin of thorax. 153. LACÆNA.

aa. Smaller, 5—7 mm.; beak truncate at tip, not carinate above; scape reaching the hind border of eyes. 154. CONFERTUS.

153 (8311). TANYMECUS LACÆNA Herbst., 1797, 35.

Elongate, subcylindrical, male; oblong-oval, female. Piceous, densely clothed with elongate-oval, ash-gray scales, those on thorax with a slight cupreous tinge; each alternate interval of elytra usually slightly darker at base. Head and beak nearly as long as thorax, densely and rather finely punctured, the beak broadly concave above. Thorax subcylindrical, widest at middle, one-fourth longer than wide, sides moderately curved; apex and base truncate; disc convex, finely and densely punctate. Elytra oblong-

oval, female, longer and slightly separated at tip, male; humeri obtusely rounded, disc feebly striate, striæ with rather small punctures; intervals slightly convex. Length 8—9 mm.

Dunedin, Fla., scarce; March 25—Dec. 28; Lake Okeechobee, March 3; Lakeland, Nov. 9; Enterprise, Sept. 15—Oct. 1; Jacksonville, April 14. Occurs in Georgia, Florida and Texas, hibernating beneath boards in damp localities.

154 (8312). TANYMECUS CONFERTUS Gyll., Schn., 1834, 88.

Elongate-oblong. Piceous-brown, above rather sparsely clothed with grayish and cupreous scales; elytra irregularly mottled with brown; under surface and legs densely scaly. Head and beak nearly as long as thorax, densely and finely punctate. Thorax subcylindrical, longer than wide, sides in front feebly rounded; disc densely and finely punctate. Elytra oblong-oval, wider at base than thorax; disc subconvex, feebly striate, the striæ with rows of large, deep punctures. Length 5—7 mm.

Southern half of Indiana, common; Lake and Starke counties only in the north; January 7—December 12. Hibernates beneath logs and other cover. Taken in early spring by sifting and later swept in numbers from low herbage along roadsides and railroads. Frequent near New York City, June—September. Occurs everywhere east of the Rocky Mountains. The scales on the thorax are so arranged as to give its surface a striped appearance, while the coppery ones on elytra are so placed as to cause them to appear mottled. Riley (1882, 916) states that both this and the next species are "polyphagus without preference for any particular plant," while according to Hamilton it breeds in wild sun-flowers (*Helianthus*). Bruner records it as an enemy of sugar beets, and also as feeding on cocklebur, pigweed and smartweed. Hamilton found it breeding and hibernating in stems of *Ambrosia trifida* L., becoming a beetle without entering the ground.

XVII. PANDELETEIUS Schönh., 1834. (Gr., "very cunning.")

Beak slightly shorter than head, feebly compressed, the nasal plate usually very small or lacking; antennal grooves on the sides rather deep, well defined, slightly curved and usually passing immediately beneath the eyes; scape gradually clavate, reaching hind border of eye; funicle 6- or 7-jointed, joints 1 and 2 elongate, 3—7 very short, moniliform; eyes small, slightly oval; scutellum small, triangular; front legs longer than the others, their femora stouter. Eleven species have been described from the United States, only two of which occur with us.

Tables of the described species are to be found as follows:
Schaffer, Chas. in Journ. N. Y. Ent. Soc., XVI., 1908, 216.
Pierce, W. D.—"Studies in North American Weevils," *in* Proc. U. S. Nat. Museum, Vol. 45, 1913, 402.

KEY TO EASTERN SPECIES OF PANDELETEIUS.

a. Beak truncate at apex; front coxæ not more widely separated than middle ones; alternate elytral intervals not elevated. 155. HILARIS.

aa. Beak emarginate at apex; front coxæ separated by about twice the distance between the middle ones; alternate intervals elevated. 156. SUBTROPICUS.

155 (8314). PANDELETEIUS HILARIS Hbst., 1797, 58.

Elongate, rather slender. Brownish, densely covered with small grayish and fuscous scales, the latter forming a dark space on disc of elytra, which is usually broken by oblique median and subapical pale cross-bars; antennæ and tarsi reddish-brown. Beak short, its upper surface finely punctate and with distinct median impressed line. Antennal funicle 7-jointed, the first joint as long as the two following united. Thorax subcylindrical, about as wide as long, constricted before and behind the middle which is strongly rounded on the sides; disc coarsely, deeply and rather densely punctate. Elytra truncate at base which is wider than thorax; disc 10-striate, striæ closely punctured; intervals convex. Under surface covered with scales having a pearly lustre. Length 4—5 mm. (Fig. 48.)

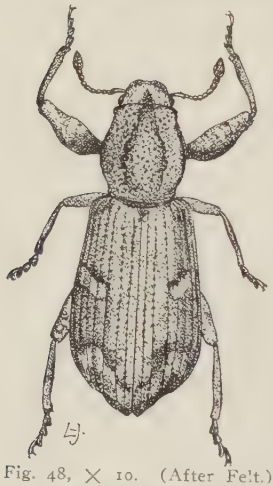


Fig. 48, × 10. (After Felt.)

Common throughout Indiana; Jan. 1—Sept. 21. Hibernates beneath logs and rubbish. Beaten in numbers from black and scarlet oak, *Quercus velutina* Lam. and *Q. coccinea* Wang.; also from beech, smart-weed and Jersey tea, *Ceanothus americana* L. Common near New York City. Ranges from Ontario and New England to Iowa, Florida and Texas. It is said by Harris to breed in trunks of the white oak, *Q. alba* L. Packard (1890, 71) calls it the "gray-sided oak weevil," and states that the larva is a worm like that of the plum weevil, which makes a smaller burrow than that of *Eupsalis minuta* Drury, and changes to a gray weevil found on the leaves of oak from May to September. When beaten into an umbrella its long front legs make its movements very awkward, and it "falls all over itself" in trying to escape, thus amply justifying its specific name.

156 (——). PANDELETEIUS SUBTROPICUS Fall. 1907, 263.

Elongate, slender. Brown, densely clothed with silver gray and pale brown scales, the latter with a metallic lustre and forming a dark stripe

on sides of thorax and broken lines on the elevated intervals of elytra. Beak very short and broad, deeply notched at tip. Funicle 7-jointed, the first joint as long as the two following. Thorax subcylindrical, apex feebly rounded, as wide or slightly wider than base, sides feebly curved; disc strongly constricted before and behind the middle, coarsely and sparsely punctate. Elytra one-third wider at base than thorax, striæ with rows of close-set punctures; intervals convex, the alternate ones more or less elevated. Length 2.5 mm.

Recorded from Key West, Fla., April 2.

Tribe II. CYPHINI.

In this tribe the beak is robust, acutely and deeply notched at tip and sides and with a fine median groove; funicle 7-jointed, its second joint usually longer than first; marginal or tenth stria of elytra often confluent with the ninth at one-third from base; second ventral segment as long as or longer than the two following, separated from the first by a strongly curved suture.

KEY TO EASTERN GENERA OF CYPHINI.

a. Tarsal claws free; second joint of funicle longer than first; corbels of hind tibiæ cavernous.

b. Elytra wider at base than thorax, their humeri prominent.

c. Scape long, scaly, passing the eyes behind; articular surface of hind tibiæ scaly; alternate elytral intervals strongly elevated. XVIII. COMPSUS.

cc. Scape short, stout, not passing the eyes; articular surface of hind tibiæ glabrous; alternate intervals not elevated; antennal grooves short, suddenly curved downwards. XIX. BRACHYSTYLUS.

bb. Elytra oval, not wider at base than thorax, their humeri rounded; scape much more slender, usually reaching the thorax.

d. Articular surface of hind tibiæ scaly; front tibiæ not toothed within; tenth elytral striæ confluent with the ninth. XX. ARTIPUS.

dd. Articular surface of hind tibiæ glabrous; front tibiæ denticulate within; tenth elytral striæ entire.

e. Joints of funicle elongate, the second as long or longer than the first. XXI. PANTOMORUS.

ee. Joints of funicle short, the second shorter than the first. XXII. LEPIDOCRICUS.

aa. Tarsal claws connate; second joint of funicle equal to first; corbels of hind tibiæ not cavernous; antennal grooves deep, directed towards the eyes but not reaching them. XXIII. APHRASTUS.

All of these genera except *Pantomorus* are placed in the group Platyomina in the Biologia, characterized by the antennal groove being superior, short, parallel or divergent; eyes not strictly lateral; elytra 10-striate; anterior tibiæ unguiculate or unarmed; posterior tibiæ laminate at apex; tarsal claws free (except in *Aphrastus*); body densely squamose. *Pantomorus* is

in the Biologia removed to Epicærini, and Pierce (1913, 411) removes the whole Horn group Artipi, including *Artipus*, *Pantomorus* and *Lepidocricus* to that tribe.

XVIII. Compsus Schönh., 1826. (Gr., "elegant.")

Beak as long as head, gradually widened and deeply notched at tip; antennal grooves deep, shallower behind, terminating above the eye; second joint of funicle longer than first, 3—7 nearly cylindrical, feebly decreasing in length; scutellum rounded. One large and handsome species occurs in the Eastern United States.

157 (8316) Compsus auricephalus Say, 1824, 310; ibid, II, 174.

Elongate-oval, robust. Piceous, everywhere densely clothed with white or greenish-white scales, those on head, legs and under surface paler and often with a coppery tinge. Thorax wider at base than long, narrower in front, sides feebly curved; disc sparsely rugose-punctate and with a broad median groove. Elytra more than twice as long as wide, sides feebly diverging to behind the middle; disc feebly striate, striæ with large distant punctures; alternate intervals strongly elevated, all bearing very short, scale-like hairs. Length 9—12 mm.

"Occurs rather abundantly from Georgia to Mexico" (*Horn*). Recorded definitely from our territory only from Natchez and Thornton, Mississippi; June 11. Taken by Townsend (1903, 94) in Texas from cotton in May, and also from *Lantana camara* L., *Ehretia elliptica* DC. and other plants in palmetto thickets and woods; June 7—25. Lays its eggs in a mass of gummy substance on leaves and folds a portion of the leaf over them so that they are perfectly concealed. The eggs hatch in 7 or 8 days and the larvæ enter the ground to feed on the roots of plants. (*Pierce*, 1916.)

XIX. Brachystylus Schönh., 1845. (Gr., "short" + "scape.")

Beak horizontal, nearly as long and broad as head, flat; eyes round; antennæ short, scaly, first joint of funicle short, robust, joints 3—7 cylindrical, subequal; scutellum rather large, oval; front and middle tibiæ mucronate. One species represents the genus in North America.

158 (8319). Brachystylus acutus Say, 1824, 310; ibid, II, 173.

Oblong, rather slender. Brownish-gray; above uniformly and densely covered with lilac-gray scales; elytra with an oblique blackish band behind the middle; under surface densely clothed with pearly scales. Head and beak together not as long as thorax, sparsely punctured. Thorax subcylindrical, slightly narrowed in front, apex truncate, base feebly bisinuate, disc

sparsely and rather finely punctate. Elytra oblong, their tips subacuminate; disc feebly striate, striæ with coarse punctures; intervals feebly convex, each with a single row of minute appressed hairs. Last ventral segment rounded in male, acutely triangular in female. Length 7.5—9 mm.

Southern half of Indiana, frequent; Kosciusko County only in the north; May 12—August 11. Beaten from persimmon and hickory and swept from low herbage. Known as the "gray persimmon weevil." Ranges from New York to Missouri, south to Georgia and Mississippi, and probably wherever the persimmon grows. Riley states that it feeds only on persimmon, but that tree does not grow in Kosciusko County, and unfortunately no habitat record was made of the half dozen specimens taken there on August 11.

XX. Artipus Sahlberg, 1823. (Gr., "not halting.")

Beak not longer than head, robust, finely grooved above; antennal grooves narrow and deep in front, broader and evanescent behind, the lower border strongly curved downward; antennæ inserted near tip, joints 1 and 2 of funicle subequal, longer than 3—7 which are also subequal; inner wings present. One species occurs in Florida.

159 (8320). Artipus floridanus Horn, 1876, 92.

Elongate-oblong. Piceous, everywhere densely clothed with white or pale greenish-blue scales, those on head and beak often with a coppery lustre; the larger punctures of elytra surrounded by a darker area. Thorax cylindrical, as wide as long, sides almost parallel, apex and base truncate; disc sparsely marked with unequal punctures and with a fine interrupted median line. Elytra nearly twice as long as wide, sides parallel for three-fourths their length; striæ with rows of fine and a few very coarse punctures; intervals flat, each with two rows of very short, scale-like hairs. Length 5—6.5 mm.

Widely distributed in Florida; Little River, March 17. Many other localities recorded by Pierce; January 3—July 1. Injurious to the orange. Mentioned by Ashmead (1880, 62) as feeding on the same plants as does *Pachnæus opalus*, and by Schwarz as feeding on leaves of oak and juniper. "Known in Florida as the 'rose bug,' and, though polyphagous, it seems to have a special fondness for citrus fruits, particularly the lime, destroying the blossoms and young fruit and nipping the margins of the leaves, which then become white, giving the tree a stunted, frosted appearance. Many of those feeding on live oaks are of a brilliant verdigris-green color, instead of the creamy-white of those feeding on citrus."*

*Hamilton Can. Ent., XXVI, 256.

XXI. Pantomorus Schönh., 1840. (Gr., "a great fool.")

Pierce, following Champion, has combined the genera *Aramigus* and *Phacepholis* Horn with *Pantomorus* Schönh., which has priority. Our species have the beak short and stout; cheeks strongly emarginate; eyes oval, prominent; scutellum small or indistinct; inner wings absent; front femora stouter than the others, their tibiæ denticulate within and mucronate at tip. To the genera combined as above mentioned belong ten nominal species from the United States, only three of which are recorded from our territory.

KEY TO EASTERN SPECIES OF PANTOMORUS.

a. Hind tibiæ with at most a double row of spines at tip; second joint of funicle twice as long as first.

b. Surface densely scaly; teeth on inner side of front tibiæ minute. 160. TESSELLATUS.

bb. Surface moderately scaly; teeth of front tibiæ larger, very distinct. 161. FULLERI.

aa. Hind tibiæ with an oval scaly disc at tip; thorax obliquely truncate; front and middle tibiæ denticulate; second joint of funicle subequal to first; elytra twice as long as wide. 162. CANDIDUS.

160 (8321). Pantomorus tessellatus Say, 1824, 318; ibid. II, 178.

Oblong-oval. Above densely clothed with grayish and brownish scales, those on thorax usually so arranged as to form a narrow pale line on the sides and a broader one each side of a wide median brownish space; elytra brownish with small paler mottlings each side of suture, a pale line on each humerus and another each side of the tips; antennæ and tarsi reddish-brown. Head and beak as long as thorax, sparsely punctured. Thorax subcylindrical, a little broader than long, sides feebly curved, apex and base truncate, disc finely punctate. Elytra oval, somewhat narrowed near tips; humeri rectangular, slightly projecting forward; disc convex, striæ fine, not closely punctured; intervals flat, bearing numerous, very short, inclined hairs. Under surface and femora densely scaly. Length 5—7.5 mm.

Vigo County, Ind., scarce; June 19. Four specimens taken from the leaves of iron-weed, *Vernonia fasciculata* Michx. They are apparently of the variety *pallidus* Horn in which the scales of upper surface are "pale greenish white with barely perceptible darker spaces arranged as in the typical variety." Ranges from southwestern Indiana and southern Illinois west and southwest to Nebraska and New Mexico. Recorded as attacking the foliage of the sweet potato.

161 (8322). Pantomorus fulleri Horn, 1876, 94.

Oblong-oval. Dark brown, rather sparsely clothed with gray or pale

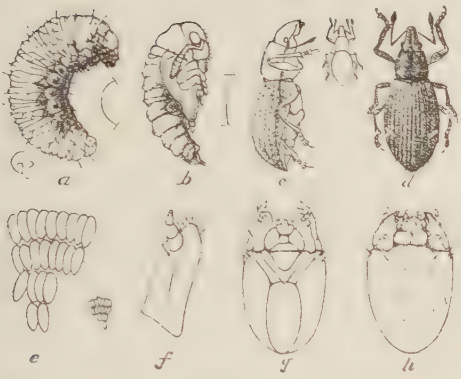


Fig. 49. *a*, Larva; *b*, pupa; *c* and *d*, adult × 3; *e*, eggs; *f*, maxilla; *g* and *h*, head of larva (After Riley.)

brown scales; elytra with a whitish or pale stripe extending from the humerus to middle along the margin, thence obliquely upward towards the suture. Head and beak longer than thorax, densely punctured. Thorax subcylindrical; disc with a fine median line, densely punctured. Elytra regularly oval, base subtruncate without humeri; disc indistinctly striate, with rows of large, rather closely placed punctures; intervals as in *tessellatus*. Length 6.5—8.5 mm. (Fig. 49.)

Not in the collection at hand from Indiana, but undoubtedly occurs about greenhouses in the State, as it ranges from New England and Wisconsin to California and Hawaii, and as far south as Florida. Now rarely found even in greenhouses near New York City. Little Falls, N. Y., Oct. 18, on carnations. According to Chittenden (1901, 88—96) it is known in economic literature as "Fuller's rose beetle," as it attacks cultivated roses and geraniums and many other greenhouse plants, as well as citrus and other fruit trees. It is destructive in both larval and imago stages, but does most damage as a larva when it lives in the soil and feeds upon the roots of its food plants, while the imago attacks the foliage, flowers and buds. The beetles are nocturnal in habit, feeding only after dark, and the female secretes her eggs by thrusting them with her beak between the loose bark and base of the stem near the ground. They are laid in batches, each lot containing from ten to 60 eggs. The latter require about a month to hatch. The best remedy so far known is to search for and destroy the beetles when they are on the plants at night, or to place traps, such as chips and boards, near the roots, under which they will hide at night. The larvæ can be readily destroyed by injecting with a small metal syringe a few drops of carbon bisulphide or a larger amount of kerosene emulsion about the roots. Fertilizing with tobacco waste and spraying with arsenate of lead is also recommended. From trees or shrubs the beetles may be excluded by wrapping with cotton bands.

162 (8325). PANTOMORUS CANDIDUS Horn, 1876, 97.

Oblong. Surface densely covered with pale gray or nearly white scales, intermixed with sparse short white hairs. Head and beak as long as thorax, median groove fine, reaching the occiput. Thorax as long as

wide at base, slightly narrowed in front and feebly prolonged over the head; sides moderately curved; disc convex, granular and with a feebly impressed median line. Elytra oval, humeri obtuse, sides feebly curved; striæ with elongate, rather close-set punctures; intervals moderately convex, densely scaly and with very short white hairs; male with tubercles on second ventral segment. Length 8 mm.

Forest City, Havana and Urbana, Illinois; June 6. Abundant on stems of plants in low ground along the railway.* (*Hart.*) Recorded elsewhere only from Kansas and Colorado. Hart states that in the Illinois specimens the thorax has a dorsal pale brown stripe divided by a fine median white line and lateral and ventrolateral darker stripes.

XXII. Lepidocricus Pierce, 1910. (Gr., "scale" + "circle.")

Beak not longer than head, separated from the latter by a deep constriction; cheeks strongly emarginate; antennæ short, first joint of funicle longer than second, the others moniliform; scales of thorax arranged in circles upon the numerous close-set tubercles; tips of hind tibiæ with a single row of fimbriæ; second segment of abdomen longer than the next two united.

163 (——). Lepidocricus herricki Pierce, 1910, 362.

Oval, robust, Surface everywhere densely clothed with grayish to brownish concave scales and intermixed bristles. Head and beak together about as long as thorax, the beak with deep median groove, coarsely and rugosely punctate, almost naked at tip. Thorax broader than long, sides strongly rounded; apex slightly narrower than base; disc closely covered with cylindrical tubercles, each with a deep bristle-bearing puncture. Elytral striæ with coarse, close-set bristle-bearing punctures; intervals flat, each with a row of short bristles. Body beneath sparsely clothed with thin scales, more densely with long white setæ. Length 5—6 mm.

Douglas Co., Kan., and Illinois; LeConte collection. Mobile, Alabama. (*Loding*). Known also from Mississippi; Ft. Scott and Onaga, Kan. and Lincoln, Neb. Pierce's type specimens were taken May 7, 1904, at Easter, Miss., and were reported as attacking cotton, "eating off the leaves and even eating the young plant before it gets out of the ground." Harned states that it has not since been reported from this locality. The punctures of the thoracic tubercles are said by Pierce to resemble little craters, and those of the elytral intervals appear linear because of the dense scaly vestiture.

XXIII. Aphrastus Say, 1831. (Gr., "unexpected.")

Head broader behind the eyes, vertex convex, beak slightly longer and narrower than head; eyes round; scape slightly

*Bull. Ill. St. Lab. Nat. Hist., VII, 1907, 248.

curved, reaching the thorax; joints 1 and 2 of funicle longer, 3—7 short, gradually becoming wider; front and middle tibiæ feebly mucronate, not denticulate within; inner wings present, but rudimentary.

KEY TO EASTERN SPECIES OF APHRASTUS.

a. Surface densely scaly; second and fourth intervals of elytra pale brown; thorax with three narrow brownish stripes; second joint of funicle slender, two-thirds longer than first. 164. TÆNIATUS.

aa. Surface more sparsely scaly; elytral intervals unicolorous; thorax without stripes; second joint of funicle stouter, one-third longer than first. 165. GRISEUS.

164 (8327). APHRASTUS TÆNIATUS Say, 1831, 9; ibid, I, 269.

Elongate-oblong, convex. Surface very densely clothed with minute pale gray scales; upper surface of head, second and fourth intervals of elytra and three narrow stripes on thorax of pale brown scales; antennæ reddish-brown, the club fuscous. Head and beak together shorter than thorax, the beak deeply notched in front, its nasal plate very large. Thorax subcylindrical, slightly narrowed in front, sides feebly curved, apex obliquely truncate, base slightly bisinuate, disc finely and sparsely punctate. Elytra oval, somewhat pointed behind, one-third wider at base than thorax, striæ with rather small, closely placed punctures; intervals moderately convex, each with a single row of minute prostrate whitish hairs. Length 5.5—6.5 mm. (Fig. 50.)

Fig. 50, × 6. (After Felt.)

Southern two-thirds of Indiana, frequent; Lake County only in the north. May 21—July 21. Mating June 17, on the great ragweed, *Ambrosia trifida* L.; also taken from pokeweed and ironweed, and by sweeping. Ranges from New England to Missouri. Common near New York City, June to September. Recorded as occurring on papaw and the white birch, *Betula populifolia* Marsh; also on sassafras, hazel, alder and other bushes in July by Smith. Breeds abundantly in the roots of various coarse grasses. (*Hamilton.*)

165 (——). APHRASTUS GRISEUS sp. nov.

Smaller and more slender than *taeniatus;* surface much more sparsely clothed with grayish scales, the brown stripes of *taeniatus* wholly absent. Antennæ stouter, the second joint of funicle shorter. Thorax more coarsely punctured, less obliquely truncate in front. Length 5—6.2 mm. (*W. S. B.*)

Marion, Hamilton and Posey counties, Indiana, scarce; May 25—July 7. Taken by sweeping. The piceous shining surface shows through the scales in many places, giving the insect a

grizzled appearance. Eight specimens from Georgia without name are in the Horn collection at Philadelphia.

Tribe III. EVOTINI.

Beak longer than head, slightly dilated near tip, which is feebly emarginate; antennal grooves narrow, deep, moderately curved, passing beneath the eyes; scutellum distinct; articular surfaces of hind tibiæ feebly cavernous, glabrous. The tribe as above characterized is represented in our territory by the single genus

XXIV. LACHNOPUS Schön., 1840. (Gr., "woolly" + "feet.")

This genus is distinguished from others of the tribe by having the submentum not pedunculate; mentum broader than long; scape passing hind border of eyes; joints 1 and 2 of funicle longer, subequal, 3—7 shorter, subequal; thorax bisinuate at base; elytra wider at base than thorax; humeri prominent.

166 (8329). LACHNOPUS FLORIDANUS Horn, 1876, 101.

Oblong-oval. Black or chestnut brown, shining; very sparsely clothed with whitish hair-like scales which, on the elytra, are in part condensed in small rounded widely isolated patches; antennæ and tarsi dark reddish-brown. Head and beak slightly longer than thorax, rather densely punctured, the beak with a median groove. Eyes prominent Thorax oval, slightly broader than long, narrowed at apex, widest at middle: disc densely, coarsely and unevenly punctate, the sides rugulose. Elytra emarginate at base, disc not striate, marked with rows of large, deep, close-set punctures; intervals feebly convex, the alternate ones with patches of condensed scales. Under surface finely and sparsely punctured. Length 6—6.5 mm.

Recorded only from Key West and Cape Sable, Fla., April—June.

Tribe IV. PHYLLOBIINI.

Head prolonged behind the eyes; beak short, stout, cylindrical, truncate or feebly notched at tip; antennal grooves short, subterminal; mandibular scar small, on the face of the mandible itself; scutellum distinct; articular surfaces of hind tibiæ terminal, glabrous; front coxæ contiguous, middle ones feebly separated.

KEY TO EASTERN GENERA OF PHYLLOBIINI.

a. Antennal grooves represented by small subterminal pits or fossæ; mentum entirely concealing the maxillæ; pubescence of sparse, bluish-green, hair-like scales. XXV. PHYLLOBIUS.

aa. Antennal grooves linear, curved and directed beneath.

b. Elytra wider at base than thorax; humeri angulate, often prominent; claws connate.

c. Beak slightly narrower than head, its nasal plate small and inconspicuous. XXVI. POLYDRUSUS.

cc. Beak very short and stout, its nasal plate large, as wide as beak and distinctly margined. XXVII. SCYTHROPUS.

bb. Elytra at base not wider than thorax, emarginate or truncate; humeri absent or rounded; wings absent or rudimentary.

d. Antennæ scaly or coarsely pubescent; body beneath rather densely scaly; length 4 or more mm.

e. Antennal grooves curved downward and directed toward the constriction between the head and beak; elytra robust, oval. XXVIII. SCIAPHILUS.

ee. Antennal grooves directed towards and just beneath the eyes; scape not passing the eyes, which are very prominent. XXIX. STROPHOSOMA.

dd. Antennæ shining, sparsely hairy; body beneath nearly naked; smaller, not over 3 mm. XXX. BARYPEITHES.

XXV. PHYLLOBIUS Germar, 1824. (Gr., "leaf" + "living on.")

Beak as long as and somewhat narrower than head; eyes oval, slightly oblique; antennæ long and slender, scape reaching the front of thorax, joints 1 and 2 of funicle longer, the second longer than first, 3—7 subequal, obconical; scutellum distinct; second ventral not as long as the two following united, its front suture nearly straight. One introduced European species occurs in our territory. (Fig. 51.)

Fig. 51. *Phyllobius sp.?* (After Kuhnt.)

167 (8332). PHYLLOBIUS GLAUCUS Scop., 1763, 31.

Elongate-oblong. Black, shining; head and thorax rather densely, elytra very sparsely clothed with bluish-green scales; antennæ and legs pale reddish-brown. Head and beak as long as thorax, densely punctured. Thorax oval, one-half broader than long, narrower at apex than base, sides strongly rounded, disc convex, rather densely and finely punctured. Elytra oblong, wider at base than thorax, sides parallel for four-fifths their length, then suddenly converging to an acuminate apex; strial punctures rather large, close-set; intervals feebly convex finely and sparsely punctate. Femora rather strongly toothed on the inner side. Length 5.5—7.5 mm.

Recorded from Canada. Gyllenhal states that in size, color and vestiture European specimens are extremely variable.

XXVI. POLYDRUSUS Germar, 1817. (Gr., "many" + "dewy.")

In this genus, with which *Cyphomimus* Horn of the Henshaw catalogue has been combined, the beak is a little shorter and narrower than the head, its tip feebly notched; antennal groove deep in front, suddenly bent and passing beneath the eyes, the latter round; antennæ long, slender, joints 1 and 2 of funicle longer, 3—7 obconical, gradually decreasing in length; club elongate-oval; inner wings present. Three species, two of them European, have been taken in the Eastern United States.

KEY TO EASTERN SPECIES OF POLYDRUSUS.

a. Scape long, slender, reaching far beyond the eyes; the latter small, separated by nearly twice their own diameters.

b. Color brown, the scales gray and pale brown. 168. AMERICANUS.

bb. Color black, the scales pale green. 169. IMPRESSIFRONS.

aa. Scape shorter, reaching hind border of eyes, the latter much larger, separated by about their own diameters; color black, the scales green. 170. SERICEUS.

168 (8333). POLYDRUSUS AMERICANUS Gyll., Schn., 1834, 136.

Oblong-oval, narrowed in front. Brown, shining, rather densely clothed with pale gray and cinnamon-brown scales, the latter forming a dark stripe on vertex, three narrow stripes on thorax, and large discal blotch on elytra; under surface piceous, shining; antennæ and legs reddish-brown. Head and beak as long as thorax, sparsely punctured. Thorax subcylindrical, as wide as long, apex obliquely, base squarely truncate, sides feebly curved, disc sparsely punctured. Elytra nearly twice as wide as thorax, humeri prominent; disc striate, striæ finely punctured; intervals flat, each with a single row of short, suberect hairs. Length 5—5.5 mm.

Lawrence and Kosciusko counties, Ind., scarce; April 28—June 3. Taken by sweeping. Portage, N. Y., common on beech; May 24. Ranges from New York, Michigan, and Toronto, Canada, south and west to Maryland and Kansas. Near New York City under stones in early spring and in December; on various plants in July and August. No record of its food habits can be found. The brown blotch on elytra is widest just behind their middle and extends forward on the first three intervals to the base. *Cyphomimus dorsalis* Horn is a synonym.

169 (——). POLYDRUSUS IMPRESSIFRONS Gyll., Schn., 1834, 140.

Elongate-oblong, slender. Black or fuscous, body everywhere densely clothed with small, round pale green scales; antennæ and legs pale reddish-brown. Beak short, its tip deeply and broadly emarginate; front impressed, deeply punctured. Thorax subcylindrical, as wide as long, base and apex truncate, sides somewhat rounded, finely punctate. Elytra one-half wider at base than thorax; disc finely punctate-striate; intervals wide, flat, each with a row of very short, reclined bristles. Length 4.7—5 mm.

A European species taken by H. H. Knight at Geneva, Batavia and Portage, N. Y., May 22—June 18. New Haven, Conn.; National Museum collection. The color of the scales is said by Gyllenhal to vary sometimes to greenish-blue or yellowish-green. "Especially numerous and mating on small plum trees, the adults feeding on the green plums and leaves, but no eggs or larvæ could be found." (*Knight.*)

170 (——). POLYDRUSUS SERICEUS Schall., 1783, 286.

Elongate-oblong, somewhat robust. Black, rather densely clothed above and beneath with rounded metallic-green scales; antennæ and legs pale reddish-brown, very sparsely scaly. Beak indistinctly carinate behind the

antennæ; front with an elongate fovea; scape reaching hind border of eye. Thorax one-third wider than long, narrowed at base and apex, sides broadly rounded, disc finely and densely punctate, with a short smooth line at middle. Elytra elongate-subcylindrical, one-third wider at base than thorax; striate, the striæ with rather large, close-set punctures; intervals feebly convex. Female with femora toothed. Length 5.5—7 mm.

Three specimens taken by Harold Morrison near Indianapolis, Ind. A common European species.

XXVII. Scythropus Schönh., 1826. (Gr., "morose.")

Beak short, stout, slightly narrowed in front, its antennal grooves badly limited, slightly curved; eyes round, distant from thorax; scape slender, passing the eyes, funicle 7-jointed, first joint slightly longer than second, 3—7 shorter, club elongate-oval; scutellum small, nearly oval; elytra wider at base than thorax, humeri obtusely prominent; articular surfaces of hind tibiæ terminal. Eight species have been described from the United States, only one of which occurs east of the Mississippi River. For a table of the species see

Fall, H. C.—In Trans. Amer. Ent. Soc., XXVII, 1901, 309.

171 (8334). Scythropus elegans Coup., Can. Nat., 1865, 63.

Oblong. Surface densely clothed with scales of variable hue, from brilliant green or slightly cupreous to ash-gray; elytra with suture always and sides usually paler; legs piceous. Head and beak as long as thorax. Thorax short, subcylindrical, wider than long, slightly narrowed in front, apex and base truncate. Elytra oblong, evenly convex at sides, narrowed at apical third; striæ finely and closely punctured; intervals flat, bearing numerous minute suberect hairs. Males with front tibiæ distinctly curved near apex, the inner and outer margins nearly parallel. Length 5—7 mm.

Ranges from New England and Ontario to Washington and California, and may, therefore, occur in the Transition Zone of Northern Indiana. Occurs mainly on the white pine, *Pinus strobus* L. Chittenden (1890, 168) says that at Ithaca, New York, it sometimes appears "in great abundance the latter part of April, continuing in constantly decreasing numbers to the middle of July. The variation in coloration is great. In the large majority the normal ground color is a rather bright fawn, tinged with a more or less coppery lustre; some are decidedly cupreous, even brilliant, inclining to a pinkish hue, while others are of an equally brilliant metallic green. Specimens taken late in the season have the scales worn or faded, leaving the body a nearly uniform dull cinereous."

XXVIII. Sciaphilus Schönh., 1826. (Gr., "shade" + "lover.")

Beak short, flat, slightly narrower than head, the tip with a broad rounded notch; antennæ long, slender, scape reaching front margin of thorax; joints 1 and 2 of funicle subequal in length, the first stouter, 3—7 shorter, obconic, subequal; club oblong-ovate, acuminate; scutellum small, triangular; second ventral segment longer than the two following united, its front suture strongly curved.

172 (10,795). Sciaphilus muricatus Fab., 1801, 544.

Oblong-oval. Fusco-piceous, rather thickly clothed with gray and cupreous scales; antennæ and legs reddish-brown. Thorax short, as wide as long, narrowed behind apex and in front of base, sides feebly rounded, disc densely and finely punctate. Elytra strongly convex, narrowed and truncate at base, side broadly rounded to the acuminate apex; disc striate-punctate; intervals feebly convex, each with a row of prominent inclined whitish setæ. Femora obtusely toothed. Length 4.5 mm.

An introduced European species, recorded from Quebec, Maine, Vermont, New Hampshire, Massachusetts and New Jersey. June 17—August. The elytra sometimes have a faint fuscous cross-bar behind the middle.

XXIX. Strophosoma Billberg, 1820. (Gr., "twisted"—"body.")

Beak short, flat, as wide as head, its tip with a broad, rounded emargination; antennæ rather long and slender, scape reaching the middle of eye; first joint of funicle longer and stouter than second; 3—7 shorter, obconic; scutellum minute. One introduced European species occurs in our territory.

173 (10,797). Strophosoma coryli Fab., 1801, 524.

Oblong-ovate. Black, densely clothed above, more sparsely beneath, with fuscous and grayish-yellow scales except in an elongate sutural spot behind the scutellum; antennæ, tibiæ and tarsi reddish-brown. Thorax short, two-thirds wider than long, apex wider than base, sides broadly rounded, disc deeply and densely punctate. Elytra as wide at base as middle of thorax, humeri indistinct, disc very feebly striate, intervals almost flat, each with a row of short curved setæ. Length 4.5—5.5 mm.

Known from Montreal, Canada; South Orange, N. J., and Long Island, N. Y. Taken from the black or sweet birch, *Betula lenta* L. Resembles the preceding in form and size, readily distinguished by its more protruding eyes, less ventricose elytra and untoothed femora.

XXX. Barypeithes Duval, 1855. (Gr., "slow" + "to move.")

Small robust species having the body sparsely hairy, devoid of scales; beak shorter than head, deeply notched at tip; antennæ inserted near its base; scape reaching thorax, first joint

of funicle stouter and longer than second, 3—7 moniliform; scutellum minute, triangular; second ventral as long as the next two, its front suture straight. *Exomias* is another name sometimes used for this genus.

174 (10,796). Barypeithes pellucidus Boh., Schn., 1834, 507.

Oblong-ovate. Dark reddish-brown to piceous, shining, sparsely clothed with long yellowish hairs; antennæ and legs paler. Beak and head shorter than thorax, sparsely and rather coarsely punctate. Thorax subglobose, as wide as long, widest at middle, sides broadly rounded, disc coarsely and rather sparsely punctate. Elytra oval, widest at middle; disc rather deeply striate, strial punctures large, close-set; intervals feebly convex, each with a row of long, inclined yellowish hairs. Under surface almost glabrous, finely and sparsely punctate. Length 3 mm.

Fall River, Mass., May 19; Batavia, N. Y., June 5. A European species known also from Massachusetts, Long and Staten Islands, N. Y., Orange Mts., N. J., and Cincinnati, Ohio. Attacks strawberries in Europe.

Tribe V. PROMECOPINI.

In this tribe the beak is short, stout, cylindrical, flattened above, not or feebly dilated in our genera, its tip emarginate; antennal grooves deep, curved, passing beneath the head immediately in front of the eyes; thorax with large ocular lobes, deeply and broadly emarginate beneath in front; tarsal claws free. The group Entimina of the Biologia is equivalent to this tribe except that *Aracanthus*, being apterous, is excluded.

KEY TO EASTERN GENERA OF PROMECOPINI.

a. Elytra broadly oval; scutellum small; length less than 4 mm. XXXI. Aracanthus.

aa. Elytra oblong, their sides parallel; scutellum larger, broader than long; length 5—8 mm. XXXII. Eudiagogus.

XXXI. Aracanthus Schönh., 1840. (Gr., "strong" + "spine.")

Beak cylindrical, scarcely longer than head, flattened above, its antennal grooves linear, not meeting but turning forwards beneath the eyes; scape reaching middle of eye; first joint of funicle longer than second, 3—7 gradually shorter, slightly flattened; club oval; scutellum very small, triangular; elytra broadly oval, very little wider than thorax at base, the humeri rectangular.

175 (8339). Aracanthus pallidus Say, 1831, 9; ibid., I. 268.

Short, oval, convex. Piceous-brown, above densely clothed with small dark gray and fuscous scales, many of which often have a coppery lustre, the darker ones forming mottlings on the thorax and elytra; antennæ, tibiæ and tarsi reddish-brown. Head and beak not longer than thorax, rather densely punctured, both with fine median impressed line. Thorax slightly wider than long, sides curved in front of middle; disc convex,

coarsely and rather sparsely punctate. Elytra feebly striate, marked with rows of rather large, somewhat distant punctures; intervals slightly convex, each with a single row of minute curved whitish bristles. Under surface and legs sparsely scaly. Length 2.7—3.5 mm.

Southern third of Indiana, frequent; April 13—July 7. Beaten from oak and ash; taken by sweeping and from beneath the bark of beech. A member of the Austroriparian fauna, known from Cincinnati, Ohio, west and southwest to Iowa, Missouri and Texas. One specimen in the Liljeblad collection labelled, perhaps erroneously, "Pawpaw Lake, Mich., July 20." Probably hibernates as imago. No record of its feeding habits can be found. A compact and handsome little species; the disc of thorax often largely fuscous with sides and median line paler.

XXXII. EUDIAGOGUS Schönh., 1840. (Gr., "pleasing.")

Beak as long as head, stout, tip feebly notched, antennal grooves narrow, deep, passing just beneath the lower border of eyes, the latter oval, pointed beneath; scape reaching middle of eye; first joint of funicle slightly longer than the others, 2—7 gradually shorter; second ventral as long as the two following united, its front suture broadly curved. Two species are known from the South Atlantic states.

KEY TO SPECIES OF EUDIAGOGUS.

a. Scutellum twice as wide as long; thorax with four discal black spaces, the two basal ones smaller; black stripes of elytra regular.
176. PULCHER.

aa. Scutellum smaller, oval; thorax with two broad, black, narrowly separated discal stripes; black stripes of elytra with irregular margins.
177. ROSENSCHŒLDI.

176 (8340). EUDIAGOGUS PULCHER Fahr., Schn., 1840, 310.

Elongate-oblong. Black, densely clothed with black and bright cupreous or greenish scales, the latter forming a narrow median and two wider lateral stripes and a post-median cross-bar on thorax, and a marginal discal and common sutural stripe on elytra, the two former often connected at middle; sides of under surface also cupreous or greenish. Beak with a deep median sulcus, densely and finely punctate. Thorax broader at middle than long, sides strongly curved in front, gradually narrowing to base, disc with scattered, rather coarse punctures. Elytra oblong, wider at base than thorax, humeri oblique, sides parallel for three-fourths of their length, then converging to a rounded apex; disc feebly striate, striæ with rows of small distant punctures; intervals flat. Length 5—8 mm. (Fig. 52.)

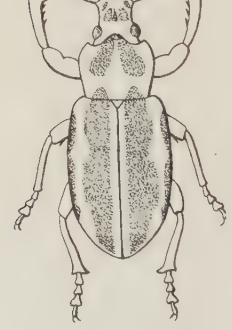


Fig. 52, × 5. (Original.)

Common throughout Florida. Ranges from there to Louisiana, southern Texas and Mexico. Hundreds were found hibernating beneath the bark of a pine log at the edge of a truck patch near Sanford, Fla., on January 13. In spring it occurs on the long-leaf pine. Feeds on different species of the sensitive pea, (*Cassia*) and other legumes. Townsend (1903, 94) reported it as "abundant on leaves and branches of *Sesbania vesicaria* Ell., in copula and eating the leaves, June 5—July 3, the larvæ probably living in the roots."

177 (8341). EUDIAGOGUS ROSENSCHŒLDI Fahr., Schn., 1840, 309.

Oblong-oval. Black, densely clothed with black and cupreous scales, the black ones forming two stripes on thorax, and on the elytra a broad stripe each side of suture and an irregular one on the sides of disc; elytral stripes often much interrupted or absent. Thorax as long as wide, sides in front rather suddenly converging, nearly parallel behind, disc sparsely and coarsely punctured. Elytra less elongate than in *pulcher*. Length 5.5—7 mm.

Pass Christian, Miss., March. Ranges from Alabama and Mississippi to Louisiana and Texas, but so far not reported from Florida. Often occurs in company with and feeding on the same plants as *pulcher*. Less elongate and more robust than the latter.

. . . . . .

In concluding our descriptions of Otiorhynchinæ, the student must be cautioned that the determination of the genus to which his specimen belongs is sometimes difficult. The system of LeConte and Horn has been mainly followed in the preceding pages, but the determination of the genus should be checked by the following additional key to the genera. This key is based upon the work of Pierce in this country and Bedel in Europe, is more modern and in some respects easier for the student to follow. Comparison with the classification adopted in Biologia Centrali-Americana has been made under each tribe.

KEY TO GENERA OF OTIORHYNCHINÆ LEC.*

a. Ocular lobes more or less developed; eyes variable, but generally elongate transverse, acuminate beneath and, in part at least, covered

b. Mentum large, covering the maxillæ.

c. Scrobes not directed beneath. The only genus in the U. S. is (EREMNINÆ Pascoe). PHYXELIS, p. 106.

cc. Scrobes directed beneath. (ENTIMINÆ Pierce).

d. Scrobes deep, well defined, at least moderately arcuate, passing inferiorly. ANAMETIS, p. 102.

dd. Scrobes evanescent posteriorly, badly defined, nearly straight or flexed gradually downward, directed toward lower angle of eye. PANSCOPUS, p. 103.

*Following Pierce, Proc. U. S. Nat. Mus., XLV, 1913, 372.

bb. Mentum smaller. (PROMECOPINÆ Pierce).

e. Elytra broadly oval, scutellum small; metasternum short.
ARACANTHUS, p. 133.

ee. Elytra oblong, broader at base than thorax, scutellum transverse; metasternum moderately long. EUDIAGOGUS, p. 134.

aa. Ocular lobes absent; eyes rounded or shortly oval and always free.

f. Scrobes linear, directed beneath.

g. Thorax with ocular vibrissæ, or if without them, with anterior coxæ narrowly separated. (TANYMECINÆ Pierce).

h. Ocular vibrissæ always present; front coxæ contiguous.

i. Thorax feebly lobed behind the eyes and bisinuate at base; eyes transversely oval, pointed beneath. PACHNÆUS, p. 117.

ii. Thorax not lobed, base truncate; eyes round or longitudinally oval. TANYMECUS, p. 118.

hh. Ocular vibrissæ frequently lacking; front coxæ separated.
PANDELETEIUS, p. 119.

gg. Thorax without ocular vibrissæ. (PSALLIDIINÆ Pierce).

j. Elytra wider than thorax at base; humeri angulate, often prominent.

k. Claws free.

l. Genæ emarginate behind the mandibles. COMPSUS, p. 122.

ll. Genæ not or hardly emarginate. LACHNOPUS, p. 128.

kk. Claws connate.

m. Beak with nasal plate small and inconspicuous.
POLYDRUSUS, p. 129.

mm. Beak very short and massive, with nasal plate large, as wide as beak and distinctly margined. SCYTHROPUS, p. 131.

jj. Elytra not wider than thorax, emarginate or truncate at base; humeri absent or rounded, wings absent or rudimentary.

n. The three intermediate segments of the abdomen equal, separated by straight sutures.* HORMORUS, p. 100.

nn. Abdominal segments unequal, separated from the first by an arcuate or angulate suture.

o. Antennæ scaly or coarsely pubescent; body beneath densely scaly.

p. Claws connate.

q. Scrobes curved downward and directed toward the constriction between the head and the beak.
SCIAPHILUS, p. 132.

qq. Scrobes directed toward or just beneath the eyes.
STROPHOSOMA, p. 132.

pp. Claws free.

r. Side pieces of mesosternum very unequal, the episternum larger and attaining the elytral margin.
EPICÆRUS, p. 99.

rr. Side pieces of mesosternum diagonally divided and equal or very nearly so, the episternum distant from elytral margin.

s. Tenth elytral stria entire. PANTOMORUS, p. 124.

ss. Tenth elytral stria confluent with the ninth.
ARTIPUS, p. 123.

*Not confirmed by our observation.

oo. Antennæ shining, sparsely hairy; body beneath nearly naked.
t. Claws free. BARYNOTUS, p. 101.
tt. Claws connate. BARYPEITHES, p. 132.
ff. Scrobes variable, never at the same time linear and directed beneath. (BRACHYRHININÆ, Pierce).
u. Elytra scarcely surpassing width of thorax at base, humeral angles rounded.
v. Tarsal claws free.
w. Corbels of posterior tibiæ cavernous. AGRAPHUS, p. 109.
ww. Corbels of posterior tibiæ open.
x. Antennæ more or less long and slender; outer joints of funicle long.
y. Hind tibiæ with two short fixed spurs. OTIORHYNCHUS, p. 110.
yy. Hind tibiæ without terminal spur. NEOPTOCHUS, p. 112.
xx. Antennæ at least moderately robust, outer joints of funicle short or moniliform.
z. Metathoracic side pieces entirely concealed; eyes with distinct orbital groove.
1. Scrobes superior, very short and deep, not reaching the eyes; anterior and middle tibiæ feebly mucronate. CERCOPEUS, p. 113.
2. Scrobes lateral, long, passing directly backward and inclosing the eyes; tibiæ strongly mucronate. CHÆTECHUS, p. 113.
zz. Metathoracic side pieces visible, suture at least moderately distinct; scrobes lateral, deep, moderately arcuate and passing directly backward to the eye. TRACHYPHLŒUS, p. 114.
vv. Tarsal claws connate.
3. Side pieces of mesosternum very unequal. GEODERCES, p. 115.
4. Side pieces diagonally divided and nearly equal; elytral oval, humeri rounded. APHRASTUS, p. 126.
uu. Elytra wider than thorax at base.
5. Claws free. BRACHYSTYLUS, p. 122.
6. Claws connate. PHYLLOBIUS, p. 129.

Subfamily X. CURCULIONINÆ.

To this subfamily belong the great majority of all our Curculionidæ. From the nine subfamilies which precede they are separated mainly by the negative quality of not possessing the peculiar characters of each as set forth in the key, p. 47. The large number of species and consequently the great variations in the principal structures used in classification, have made very difficult the preparation of a table which will represent in lineal arrangement the proper relationships of the tribes composing the subfamily. In the key which follows we have first excluded (a) the species with beak curled under the head and thorax (Tribes

XIX.—XXI); (b) those with the humeri cut off by the protruding side pieces (XVII.—XVIII.); and (c) the cylindrical Lixus-like forms in which the first ventral segment is in part visible from above (XV.—XVI.) We have then placed first the short, broad-beaked species (Tribes I.—II.), similar in appearance to the Otiorhynchinæ and like them living near or on the earth. These are followed by the tribes with unequal ventral segments that live for the most part on primitive coniferous trees (IV.—V.) or on clover or subaquatic vegetation (III. & VII.). Next come the great mass of small species with ventral segments nearly equal and with toothed claws (VIII.—XIV.), including a few small tribes exhibiting special adaptations. Finally, the tribes first excluded are brought in to close the series with the nearest approach to Thecesterninæ and Calandrinæ. The Hormopini (known by one rare species only) and the Sternechini remain doubtful as to position until more material has accumulated. Many of the tribes have been subdivided by European authors, as will be noted in the pages that follow, and their papers should be consulted by the student in connection with the key here given, in which only the principal characters are used.

KEY TO TRIBES OF CURCULIONINÆ.

a. Beak free, not received in the breast in repose (except partially in the genera *Orchestes* and *Bagous*.).

b. Humeri not truncated by protruding side pieces of mesothorax.

c. Lateral angles of first ventral segment covered by elytra.

d. Beak short, broad; claws simple; ventral segments nearly equal; gular peduncle short, broad; mentum large, quadrate. Tribe I. SITONINI, p. 140.

dd. Beak usually at least as long as thorax; gular peduncle usually long.

e. Ventral segments unequal, third and fourth united not or scarcely longer than second or fifth.

f. Gular margin prominent, peduncle and mentum retracted; beak only as long as thorax, rather stout; elytra oval, humeri wanting. Tribe II. ALOPHINI, p. 144.

ff. Gular margin not prominent, peduncle usually long; front coxæ contiguous (slightly separated in Pissodini).

g. Tarsal claws simple; ventral sutures not angulated.

h. Eyes not contiguous beneath.

i. Mandibles usually emarginate and two-toothed at tip. Tribe III. HYPERINI, p. 145.

ii. Mandibles bi-emarginate, three-toothed at tip.

j. Tibiæ with corbels, and with a long curved claw at apex, which is oblique, dilated and ciliate; length 4 or more mm.

k. Antennæ inserted entirely on the sides of the more slender cylindrical beak, their insertion concealed from above; front coxæ slightly separated. Tribe IV. PISSODINI, p. 178.

kk. Antennæ inserted toward sides of the thicker, more powerful beak, their insertion visible from above; front coxæ contiguous. Tribe V. HYLOBIINI, p. 183.

jj. Tibiæ without corbels, truncate at tip; length usually less than 4 mm., never over 7 mm. Tribe VII. ERIRHININI, p. 189.

hh. Eyes large, transverse, widely separated above, contiguous beneath. Tribe VI. HORMOPINI, p. 188.

gg. Tarsal claws toothed; ventral segments less unequal, the sutures strongly angulated at sides, the points of the second segment reaching the fourth in some genera. (Fig. 22, *d*.) Tribe VIII. TYCHIINI, p. 238.

ee. Ventral segments nearly equal, though the first may be longer than the others; claws more or less toothed.

l. Thorax pedunculate (with a definite neck), i. e., strongly narrowed at base; ant-like in appearance. Tribe IX. OTIDOCEPHALINI, p. 247.

ll. Thorax not pedunculate.

m. Hind angles of thorax acute or produced; outline cuneiform or broader behind. Tribe X. MAGDALINI, p. 253.

mm. Hind angles of thorax obtuse.

n. Mandibular motion vertical; beak often very long and thin (nut-and acorn-weevils). Tribe XI. BALANINI, p. 261.

nn. Mandibular motion horizontal; claws cleft, toothed or appendiculate.

o. Ventral sutures straight; size small, seldom over 4 mm. in length. Tribe XII. ANTHONOMINI, p. 273.

oo. Ventral sutures angulate at sides.

p. Funicle 6- or 7-jointed; pygidium covered. Tribe XIII. PRIONOMERINI, p. 322.

pp. Funicle 5-jointed; pygidium usually exposed. Tribe XIV. MECININI, p. 325.

cc. Lateral angles of first ventral segments uncovered.

q. Form elongate, subcylindrical; elytra without acute post-humeral angle; length 6 or more mm. Tribe XV. CLEONINI, p. 328.

qq. Form shorter, broad; elytra with acute post-humeral angle; length less than 5 mm. Tribe XVI. STERNECHINI, p. 344.

bb. Humeri truncated by side pieces of mesothorax, which are visible from above, protruding as rounded knobs between thorax and elytra.

r. Ventral sutures wholly straight; beak shorter than head; (elytra in our single species largely red.) Tribe XVII. LÆMOSACCINI, p. 345.

rr. Ventral sutures more or less curved; beak longer than head. Tribe XVIII. BARINI, p. 346.

aa. Beak received in or upon the breast in repose; upper surface often very uneven.

s. Eyes not covered by postocular lobes in repose, very large and ap-

proximate in front; abdomen usually sloping upward.
Tribe XIX. ZYGOPINI, p. 417.

ss. Eyes in repose more or less covered by ocular lobes.

t. Pygidium exposed; body broad; thorax usually with acute tubercles. Tribe XX. CEUTORHYNCHINI, p. 424.

tt. Pygidium covered; body oval; elytra and thorax often tuberculate.
Tribe XXI. CRYPTORHYNCHINI, p. 464.

Tribe I. SITONINI.

This tribe is represented in the United States by a single genus, the species of which approach closely in general appearance certain of the Otiorhynchids,* but are wholly without a mandibular scar. They have the mandibles short, very stout, the outer side convex, roughly punctured, broadly notched at tip, the inner edge acute; beak short, broad, flat, emarginate at tip; antennal grooves deep, short, curving abruptly downwards just behind the antennæ; scape reaching middle of eyes, funicle 7-jointed, joints 1 and 2 short, thick, 3—7 shorter, subequal, club elongate, ringed, wholly sensitive; eyes small, rounded; inner wings present; front coxæ contiguous, prominent, hind ones widely separated, reaching the side margin; claws slender, divergent, appendiculate. Many of the species are, in the larval stage, very injurious to clover, peas and other legumes.

For literature treating of the North American species see:

Allard, E.—in Ann. Soc. Ent. Fr., 1864, 329.

Casey, T. L.—in Ann. N. Y. Acad. Sci., IV, 1888, 280.

Wildermuth, V. L.—1910, 29—38.

I. SITONA Germ., 1824. (Gr., "grain merchant.")

About 25 nominal species have been described from the United States, most of them by Casey from California. Of these four, common to both this country and Europe, occur in the Eastern States.

KEY TO EASTERN SPECIES OF SITONA.

a. Setæ of elytral intervals very distinct.

b. Scales of upper surface dark gray and cupreous; setæ long, erect. 178. HISPIDULA.

bb. Scales grayish-yellow and pale brown; setæ short, recurved. 179. DISCOIDEA.

aa. Setæ wholly wanting or very minute.

c. Color nearly uniform brown; vestiture fine, hair-like, setæ wholly wanting; length 4.5—5.5 mm. 180. FLAVESCENS.

cc. Color steel-gray, elytra usually with paler stripes; vestiture of scales, setæ minute; length 3—4.5 mm. 181. TIBIALIS.

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*The Sitonini were included by Lacordaire among his "Naupactides," most of which are now included in Otiorhynchinæ. They are treated by Reitter (1912) as a tribe of Brachyderinæ, nearly equivalent to Otiorhynchinæ; but in the Biologia Champion has followed LeConte and Horn, and Bedel in placing them first among the tribes of Curculioninæ, has, as we believe, given them their proper position.

178 (8346). Sitona hispidula Fab., 1776, 226.

Fig. 53, X 6. (After Wildermuth.)

Oblong, convex. Piceous-black, shining; above rather densely clothed with minute oval, cupreous and grayish scales, those on thorax arranged to form a narrow median and two broader lateral stripes; antennæ, tibiæ and tarsi reddish; club and femora piceous. Head and beak about as long as thorax, deeply and rather coarsely punctate. Thorax subcylindrical, as wide at middle as long, apex and base truncate, sides feebly rounded; disc coarsely, sparsely and deeply punctate. Elytra one-half wider at base and twice as long as thorax; disc feebly striate, striæ punctate; intervals slightly convex, each with a single row of stout, inclined, grayish setæ. Under surface sparsely clothed with fine prostrate hairs. Length 3—5 mm. (Fig. 53.)

Lake, Starke, Marion, Wayne, Hamilton and Posey counties, Ind.; probably throughout the State; April 13—Sept. 1. Not rare near New York City, crawling on suburban sidewalks late in fall; hibernating at South Orange, N. J., January—February. Ranges from Ottawa, Canada, and New England to Nebraska south to District of Columbia and Missouri. First noted in this country by LeConte at Long Branch, N. Y., in 1876, from about the roots of grass growing on sand dunes, it has spread westward to the Mississippi or beyond and has also been recorded from Pullman, Washington. Known as the "clover root curculio," the eggs being deposited on the under side of the leaves and the larvæ feeding upon the roots of the red and white clovers, alfalfa and blue-grass. The younger larvæ feed upon the smaller, more tender roots while the more mature ones often eat large cavities and grooves along the larger roots. The adults feed on the leaves, eating out irregular patches along the margins. From 38 to 43 days are required from the egg to the imago stage, the larval period varying from 17 to 21 days. The hibernating females deposit their eggs early in spring, the first beetles from these eggs appearing in May and June. Two broods probably occur each season. A rotation of crops is one of the best remedies for getting rid of the beetle where it is very destructive.

Fig. 54. Larva of *Sitona hispidula* X 10. (After Wildermuth.)

Fig. 55. Pupa of *Sitona hispidula* X 8, showig form of beak. (After Wildermuth.)

179 (——). SITONA DISCOIDEA Gyll., Schön., 1834, 112.

Elongate-oblong. Piceous, antennæ and legs reddish-brown, everywhere closely, uniformly and evenly clothed with small grayish-yellow and pale brown scales, the grayish ones forming a broad stripe each side and sometimes a narrow median line on thorax, the stripes extending back onto humeri and along the second, third and fourth intervals of elytra nearly to apex; margins and tips of elytra and under surface also pale. Beak as long as head, the frontal groove deep, distinct. Thorax as long or slightly longer than wide, sides feebly curved, disc deeply, rather coarsely and closely punctate. Elytra but slightly wider at base than middle of thorax, sides feebly diverging to apical third then strongly converging to apex; disc more convex at middle than base, striæ fine, their punctures small; intervals slightly convex, each with a row of short but distinct white inclined setæ. Length 4—4.5 mm.

Watch Hill, Rhode Island, July 16. Taken in numbers by Wirt Robinson in company with *tibialis* on a beach pea. A European species, usually regarded as a variety of *Sitona humeralis* Stephens.

180 (8347). SITONA FLAVESCENS Marsham, 1802, 311.

Elongate-oblong. Piceous-black; above densely clothed with rusty brown and fuscous narrow, hair-like scales, the darker ones in fresh specimens forming two indistinct stripes on head and four on thorax; under surface more sparsely clothed with fine prostrate grayish hairs; antennæ, tibiæ and tarsi reddish-brown; club and femora darker. Beak and head about as long as thorax and, like it, finely and rather closely punctate. Thorax subcylindrical, as wide as long, widest at middle, sides feebly rounded, apex and base truncate. Elytra one-third wider at base than thorax, sides parallel to apical fourth, thence rapidly converging; disc very finely striate, the striæ with rows of minute punctures. Second ventral segment about as long as the two following united. Length 4.5—5.5 mm. (Fig. 56.)

Fig. 56, × 10. (After Forbes.)

Northern half of Indiana, frequent; not taken south of Marion Co.; May 1—August 26. Taken especially by sweeping low herbage, such as rushes and grasses along the borders of lakes and marshes; from sidewalk in city of Indianapolis on May 1. Less

common than *hispidula* about New York City. An introduced European species known as the "yellow clover curculio," which has spread from Newfoundland and New England, west and north to Iowa and Minnesota. LeConte, in 1876, recorded it as abundant near the seashore in the Atlantic states. In England it is very injurious to clover. Webster first recorded it from Indiana (1886, 580) as being abundant and injurious to white and alsike clovers on the grounds of Purdue University at Lafayette. He states that the beetle eats through the back of a folded clover leaf at the midvein, thus forming a circular disk when the leaf is unfolded. They also often eat a hemispherical portion from the margin, and if from the same leaf, this leaves only the leaf stalk and bases of the midveins. The larvæ live on the clover-roots and pupate in a small earthen cell. Both adults and larvæ hibernate, the latter pupating in spring, the pupal stage lasting about 20 days. The adults seem to wander about in early spring, and Webster says that he has often seen them upon the heads of grain, traveling along upon fences and the trunks of trees and hiding away under rubbish.

181 (8348). SITONA TIBIALIS Hbst., 1795, 217.

Elongate-oblong. Black, rather sparsely clothed with small oval or rounded grayish and brown or brassy scales, the latter forming a rather broad sutural and a marginal stripe each side of elytra; antennæ and legs reddish-brown, apical halves of femora darker. Beak and head longer than thorax, coarsely and sparsely punctate, the frontal groove very distinct. Thorax as in *flavescens*, the punctures of disc rather coarse and sparse. Elytra one-half wider at base than thorax; disc distinctly striate, the strial punctures small; intervals moderately convex, each with a row of very short setæ. Length 3.5—4.5 mm.

Lake and Kosciusko counties, Ind., scarce; May 29—June 29. Taken by sweeping low herbage. Watch Hill, R. I., July 16. Ranges from Newfoundland to Vancouver, B. C., Kansas and New Mexico. LeConte states that it was probably introduced from Europe in earth around roots of shrubs and trees. In addition to the above named species (all that we are able to recognize in the Eastern material before us), there are references in literature to the following:

S. crinita Oliv., described from "America," known from the Pacific coast and recorded, perhaps through erroneous identification, by Smith from New Jersey.

S. lineellus Bonsd. (1785, 30), of which *scissifrons* Say and *indifferens* Say (1831, 10) are treated by Allard (1864) as varieties. It was de-

scribed from "Amer. Bor.," and cited as a Canadian species by Couper and other authors of a generation ago. LeConte referred to this species Kansas specimens with erect elytral setæ; possibly, therefore, the eastern records were based on the species now called *hispidula.*

Tribe II. ALOPHINI.

To this tribe belong a small group of genera having the mandibles flat and punctured on the outer side, pincer-shaped, their tips emarginate; beak rather stout, as long as thorax, expanded each side at tip and usually with a median groove along its upper surface; scape long, funicle 7-jointed, club oval, pointed, annulated; eyes transverse, narrowed below, finely granulated; thorax usually with distinct postocular lobes; elytra oval, convex, without humeral angles, strongly deflexed behind the middle; front coxæ contiguous, prominent; first, second and fifth ventral segments long, third and fourth united, equal to or longer than either first or second; tarsi dilated, claws simple. Two of the six genera comprising the tribe are represented in our territory.

KEY TO EASTERN GENERA OF ALOPHINI.

a. Beak finely channelled; upper surface of body clothed with hairs, not at all scaly; tarsi brush-like beneath. I. TRICHALOPHUS.

aa. Beak not channelled or carinate above; body covered with scales intermixed with bristles on the elytra. II. LEPIDOPHORUS.

I. TRICHALOPHUS Lec., 1876. (Gr., "hairy"+"without crests.")

Rather large, oblong-oval species having the beak with a single groove above and on each side; second joint of funicle slightly longer than first; head and thorax densely punctured; elytral striæ almost obsolete. One of the six known species occurs with us, the other five occurring in the Northwestern United States and Canada.

182 (8355). TRICHALOPHUS ALTERNATUS Say, 1831, 10; ibid. I, 271.

Oblong-oval. Piceous black, rather thickly clothed with prostrate brown and white hairs, the latter forming a faint line each side of thorax and numerous small spots alternating with brown ones on elytra, the most prominent of which is near the apex of each elytron. Beak almost straight, rugosely punctate, clothed with small, hair-like fuscous scales. Thorax slightly wider than long, feebly impressed near apex, disc coarsely and closely punctate, obsoletely carinate on median third. Elytral intervals wide, flat, densely and finely punctured. Length 9—11 mm.

Known from Ontario, Canada, Lake Superior and the Northwest.

II. Lepidophorus Kirby, 1837. (Gr., "bearing" + "scales.")

Small oblong-oval species having the beak shorter than thorax, stout, subcylindrical, straight; antennal grooves broad, short, directed toward the eyes, scape nearly as long as the remainder of the antennæ, reaching across the eye, first joint of funicle as long as the next two united, 3 –7 equal in length, club oval, pointed; thorax without postocular lobes; scutellum very small or invisible; femora clavate, unarmed. One of the two known species occurs with us.

183 (——). Lepidophorus setiger Hamilton, Trans. Am. Ent. Soc., XXII, 1895, 347.

Oval, convex. Piceous, antennæ and legs reddish-brown; above rather densely clothed with small, round, brownish and scattered white scales, the latter easily abraded, forming three faint stripes on thorax and feeble mottlings on elytra; under surface less densely scaly. Beak dilated towards tip, a little flattened above, densely scaly. Thorax slightly wider than long, convex, feebly narrowed in front, not constricted at apex, except at sides, densely, rather coarsely punctured, each puncture bearing a small round scale. Elytra one-half wider than thorax, subinflated, finely striate, with close, minute punctures in the bottom; intervals wide, flat, seemingly impunctate, each with a row of stout yellow inclined setæ extending from base to apex. Male with hind part of metasternum and first and second ventral segments jointly concave; third and fourth ventral segments united one-half longer than either of the preceding and equal to fifth. Length 3—3.5 mm. (Fig. 57.)

Fig. 57, × 11. (Original.)

Deer Park, Maryland, April 7. St. Vincent, Pa., Virginia and New York. The pale stripes of thorax and mottlings of elytra are only visible in well preserved specimens. Differs from *lineaticollis* Kirby in its smaller size, the latter also having a "longer beak, a different form of thorax, larger scales, and the elytral setæ visible only on the declivity." (*Hamilton.*)

Tribe III. HYPERINI.

Species of medium or rather large size having the body more or less oval; mandibles broad, stout, more or less pincer-shaped, emarginate at tip (except in *Hypera*); antennæ inserted on the sides near tip of beak, elbowed, scape long, funicle 7-jointed, the first two joints longer than the others, club elongate-oval pointed; beak usually rather long, its antennal grooves reaching nearly to tip, deep, directed toward the lower part of eye; scutel-

lum very small; pygidium not exposed; front and middle coxæ round, the latter narrowly separated; hind tibiæ truncate at tip, the articular surface terminal or oblique; claws simple, usually separate. The first two of our genera have been recently monographed by

Titus, E. G.—"The Genera Hypera and Phytonomus in America north of Mexico," *in* Ann. Ent. Soc. Amer., IV, 1911, 383—473.

KEY TO GENERA OF HYPERINI.

a. Ventral segments not very unequal; post-ocular lobes of thorax absent; eyes separated by not more than their own diameters.

b. Articular surface of hind tibiæ terminal, well defined; smaller, not over 8.5 mm.

c. Beak shorter than thorax; mandibles never emarginate; thorax much narrower than elytra, the latter strongly convex. I. HYPERA.

cc. Beak longer than thorax; mandibles emarginate; thorax not more than one-third narrower than elytra, the latter more elongate, much less convex. II. PHYTONOMUS.

bb. Articular surface of hind tibiæ oblique, ill defined; size large, 9 or more mm. III. LEPYRUS.

aa. Ventral segments very unequal, the third and fourth short, united equal to one of the others.

d. Second joint of funicle much longer than first; tibiæ strongly mucronate; larger, usually more than 5 mm. in length. IV. LISTRONOTUS.

dd. Second joint of funicle as long as or but little longer than first; tibiæ feebly mucronate; smaller, seldom over 4.5 mm. in length. V. HYPERODES.

I. HYPERA Germ., 1821. (Gr., "a cord.")

To this genus there is known from our fauna only the single introduced European species:

184 (8427). HYPERA PUNCTATA Fab., 1775, 150.

Oval, robust. Piceous black, everywhere finely and densely punctate; thickly clothed with gray scales having a metallic lustre (var. *opimus* Lec.) or with brown, yellow-brown or blackish-brown scales which are short, broad and emarginate at tips, also with numerous short suberect bristles; edge of elytra yellow-brown or at least paler then the disc. Beak two-thirds the length of thorax, its under surface, sides and tip above, polished. Thorax one-third wider than long, sides rounded at middle, then feebly converging to base. Elytra one-fourth longer than broad, sides parallel for three-fourths their length, thence broadly rounded to tips; striæ finely punctate, the sutural and each alternate interval wider and slightly more elevated than the others. First ventral segment of male impressed and emarginate behind. Length 5—8.5 mm. (Fig. 58.)

Common throughout Indiana; more so in the northern counties; April 23—October 22. Taken from beneath rubbish, especially along the mud flats and borders of lakes; on sidewalks in Indianapolis, June 1 and October 1. Described from Sweden and common over Europe and northern Asia; introduced into the United States about 1850 and now established from Newfoundland to North Carolina west to Iowa and Texas; also in a few places on the Pacific Coast. Known as the "clover-leaf beetle," since both larvæ and adults feed upon the tender stems and young leaves of all kinds of clover and alfalfa. The eggs are laid in the fall in old clover stems or in dead leaves and debris at the base of the plant. The majority of eggs hatch in autumn, but some winter over and hatch early in the spring. The larvæ hibernate in the stems and among the old leaves, and on warm winter and spring days they come forth and feed on the young leaves. When full grown they form cocoons, the pupal period lasting from 10 to 20 days. But one brood occurs each season, the adults emerging from May to mid-July. After mating most of the adults die, but a few doubtless hibernate. In dry seasons the damage to the clover crop from the weevil may be serious, but in wet ones it is held in check by a parasitic fungus, *Entomophthora sphærosperma* Fres., which attacks not only the larvæ of *H. punctata* but those of many other insects. (*Folsom*, 1909.)

Fig. 58, × 7. (After Forbes.)

II. Phytonomus Schönh., 1826. (Gr., "plant" + "preying.")

Body never stout, broad and thick as in *Hypera;* intercoxal process somewhat narrowed at tip; stem of male genitalia much longer than wide. Other characters as in key. The larvæ feed mainly upon legumes or species of dock (*Rumex*). Seven of the 13 species known from North America occur in the Eastern States.

KEY TO THE EASTERN SPECIES OF PHYTONOMUS.

a. Scales not at all cleft or emarginate.

b. Body not elongate or flattened; sides of elytra never parallel; scales truncate, concave, widest at middle, striate. 185. EXIMIUS.

bb. Body elongate, flattened; sides of elytra parallel; thorax not polished, punctures shallow, indistinct, glabrous, more or less confluent; scales parallel-sided or narrowed at tip, thick, indistinctly striate; no hairs on dorsum. 186. COMPTUS.

aa. Scales either emarginate or deeply cleft.

c. Emargination of scales not reaching the middle.

d. Thorax as wide as long; punctures of elytral striæ with minute setæ; hairs on thorax thick at base, abruptly narrowed to a point near tip. 187. TRIVITTATUS.

dd. Thorax longer than wide; setæ in elytral striæ short, thick and white; hairs on thorax thick, their sides parallel, tip notched. 188. MARITIMUS.

cc. Scales cleft nearly or quite to base.

e. Thorax distinctly wider than long, its sides strongly rounded.

f. Elytral scales reddish or greenish-gray, more or less tessellated with dark brown; thorax one-half wider than long. 189. MELES.

ff. Elytra with ash-gray scales and three abbreviated blackish lines; thorax but slightly wider than long. 190. POLYGONI.

ee. Thorax not wider than long; species rather narrow, elongate; pubescence of long, fine, green or greenish hairs without intermixed scales. 191. NIGRIROSTRIS.

185 (8431). PHYTONOMUS EXIMIUS Lec., 1876, 414.

Oblong-oval. Black; above densely clothed with golden yellow, rust red, brownish black or black scales, the black ones forming small scattered quadrate spots on the elytra; antennæ and legs black. Beak slightly shorter than thorax, densely and finely punctured. Antennæ long, the scape reaching the eye; first funicular joint large, conical, as long as the next three. Thorax as long as wide, narrowed in front, sides rounded at middle; scales of disc and sides quadrate, striate. Elytra at base one-third wider than middle of thorax, widest behind the middle, punctures of striæ without hairs; intervals flat without setæ. Under surface clothed with pale scales. Length 4.8—5.5 mm.

Known from northern Illinois to Manitoba, Colorado and Texas. Popenoe states (1877, 38) that the types were bred from pupæ in cocoons found on the leaves of the great water dock, *Rumex brittanica* L., at Topeka, Kansas. Knaus found the adults mating on *Rumex* on April 23. Young larvæ were then present and feeding on the leaves.

186 (8430). PHYTONOMUS COMPTUS Say, 1831, 12; ibid, I, 274.

Elongate, flattened. Color variable, reddish-brown or rust-red to black, rather closely covered with small rounded brassy scales; tip of beak,

antennæ and legs reddish-brown. Beak about as long as thorax, female, shorter, male, finely and closely punctate. Scape of antennæ as long as funicle, not reaching the eye, first joint of funicle one-third longer than second, which is slightly longer than third. Thorax as long as wide, sides rounded, disc finely and densely punctate, each puncture closed by a scale. Elytra elongate-oval, sides parallel for four-fifths their length; striæ distinct, finely punctured; intervals flat, without setæ. Under surface covered with paler scales. Length 3.3—5 mm.

Common throughout Indiana, more so in the western half; April 23—July 8. Mating on the water persicaria, *Polygonum amphibium* L., June 7; taken also from Jersey tea and other plants, usually near moist places. Ranges from Quebec and New England to the Rocky Mountains, south to Texas. Known also from Oregon and Washington. Probably feeds on a number of species of *Polygonum*, the cocoons being formed on the upper side of the leaves, the edges of which are bent over it to aid in concealment.

187 (8429). PHYTONOMUS TRIVITTATUS Say, 1831, 12; ibid, I, 273.

Elongate-oval. Black or dark reddish-brown, usually densely clothed with yellowish-brown scales and long pale hairs, the scales arranged to form a pale median line on thorax and a broader stripe on each side, the latter extending back onto the humerus and often along the third interval to beyond middle; elytra with the alternate intervals, especially those on the sides, tessellated with dark brown and also with a large dark humeral spot; antennæ reddish-brown; legs darker. Head densely pubescent, the long hairs extending down the beak, which is marked with a smooth carina and a long narrow stria above the antennal groove. Thorax strongly rounded on the sides; disc rather coarsely, sparsely and deeply punctate. Elytra about four times longer than thorax; striæ very distinct, each puncture bearing a short hair; intervals with longer recurved white hairs. Length 3.8—6.5 mm.

Osborn, Lake County, Ind., June 21. Ranges from northern Indiana west and southwest to Vancouver, B. C., Kansas and New Mexico. Palos Park, Chicago, specimens were bred from larvæ collected on the ground pea, *Lathyrus venosus* Muhl., emerging as adults on June 28. *P. setigerus* Lec. is a synonym.

188 (——). PHYTONOMUS MARITIMUS Titus, 1911,432.

Elongate-oblong. Reddish-black, clothed with pale yellow scales and white and black hairs, the scales arranged to form stripes and dark spots on thorax and elytra, much as in *trivittatus*. Thorax narrower in front than behind, widest at middle; sides strongly rounded, disc coarsely, often confluently punctured. Elytra at base but slightly wider than thorax; the declivity very prominent and extending quite to the tip. Length 5—6.5 mm.

Known only from Chatham, and Nantucket and Martha's Vineyard Islands, Massachusetts. Taken in June and July on the common vetch, *Vicia sativa* L.

189 (——). PHYTONOMUS MELES Fab., 1792, 466.

Elongate-oval. Black or reddish-black, the thorax sparsely covered with metallic gray or pale brown scales, a central line and sides often paler; elytra nearly uniform in color, clothed with reddish-gray or greenish-gray scales but sometimes tessellated with white and brown; antennæ and legs reddish-yellow or darker. Beak slender, cylindrical, longer than thorax in female, carinate above, striate on the sides. Scape reaching eye, first funicular joint twice as long as second, 4—7 wider than long. Thorax widest at middle, disc almost flat, rather densely punctate. Elytra at base scarcely wider than middle of thorax, nearly rectangular; striæ fine, punctate; intervals feebly convex, bearing numerous short, scattered, recurved hairs. Third ventral segment of male with a median shallow impression. Length 3.5—5 mm.

West Point, N. Y., April 19—23. Occurs all over Europe excepting Spain; also in parts of Asia and along the north coast of Africa. In America it is known from Canada, New England, New York and New Jersey. Occurs from May to July on clover. The cocoon is ovoid, of an amber color and remarkable for its reticulations. The *P. castor* of Smith's New Jersey list is this species.

190 (——). PHYTONOMUS POLYGONI Fab., 1801, 520.

Form and size of *meles*. Pubescence of pale brownish and grayish scales which are cleft almost to base, the gray ones forming a distinct median and lateral stripes on thorax and covering portions of the alternate intervals of elytra; suture from basal third to apex and basal portions of third intervals fuscous black. Thorax narrower at middle than in *meles*, the sides less rounded. Elytral intervals more convex. Length 5.2 mm.

Two specimens in LeConte collection labeled "Southern Illinois." A European species which is liable to occur anywhere in the Eastern United States.

191 (8434). PHYTONOMUS NIGRIROSTRIS Fab., 1775, 132.

Elongate-oval. Reddish-brown to black, thickly clothed with greenish, rarely yellowish scale-like hairs; head black; thorax often with a narrow median pale line; antennæ and legs reddish-brown. Beak as long as thorax, male, longer, female; curved, cylindrical, polished, with a median dorsal carina its full length. Scape reaching almost to middle of

Fig. 59, × 14. (After Webster.)

eye, first joint of funicle not twice as long as second, 3—7 regularly shorter and broader. Thorax slightly longer than wide, sides feebly rounded in front of middle, disc coarsely and closely punctate. Elytra elongate-oval, humeri rounded, sides nearly parallel; striæ very fine, distinctly punctate, intervals each with a row of short, stiff, whitish inclined hairs. Abdomen finely and rather sparsely punctate. Length 3.5—4.5 mm. (Fig. 59.)

Vigo County, Indiana, rare; June 11. The pubescence of the upper surface is quite variable in hue, ranging through various shades of green to yellowish or even gray brown. Known as the "lesser clover-leaf weevil." Occurs all over Europe, Egypt and part of Asia. Found in the United States prior to 1873 and has since spread from Canada to Virginia and west to Minnesota. Feeds on all varieties of clover and alfalfa, the larvæ eating into the base of the heads and feeding on the tender leaves. They are attacked in wet season by the same fungus as preys upon *Hypera punctata*, which will probably hold them in check. A spring flight of adults has been recorded in April in Delaware.

III. Lepyrus Germ., 1815. (Gr., "husk of a nut.")

Species of medium or large size having the beak more than twice the length of head, deflexed, subcylindrical, distinctly enlarged towards tip; antennæ short, rather slender, joints 1 and 2 of funicle, rather long, obconical, 3—7 shorter, top-shaped; thorax short, subconical, much narrowed in front, sides but little rounded, base and apex truncate; scutellum small, triangular; elytra oblong-ovate, above moderately convex, narrowed toward the tips; tibiæ all armed on the inner side near the apex. They occur mainly in the colder parts of the world and are found on plants or the ground. Nine species are recognized as inhabiting North America, three of which are known from the Eastern States. For literature pertaining to the genus see

Casey, T. L.—Ann. N. Y. Acad. Sci., VIII, 1895, 822.

Hamilton, John.—"*Lepyrus*" in Can. Ent., XXVIII, 1896, 122, 184.

KEY TO EASTERN SPECIES OF LEPYRUS.

a. Inner wings present; elytra each with a small median pale spot.

b. Thorax conical; femora armed on inner side with a small tooth; elytral intervals equal. 192. PALUSTRIS.

bb. Thorax much wider at middle than at base; femora unarmed; alternate intervals of elytra narrower and more depressed. 193. ALTERNANS.

aa. Inner wings absent; femora unarmed; elytra without median pale spot; intervals equal or nearly so. 194. CAPUCINUS.

192 (8438). Lepyrus palustris Scop., 1763, 33.

Elongate-oval. Black, sparsely clothed with gray and yellowish hair-like scales; an oblique stripe on each side of thorax, a small rounded spot near middle of fourth interval of elytra, and a row of spots each side of abdomen of longer, denser white or yellowish scales; femora annulate with white. Beak slightly longer than thorax, densely and finely punctate, its dorsal carina fine but distinct throughout. Second joint of funicle much longer than first. Thorax one-fourth wider than long, apex two-thirds as wide as base; disc coarsely and densely rugose-punctate, the median carina narrow but distinct. Elytra one-half longer than wide, less than twice as wide as thorax, separately subacuminate at tip; intervals finely and densely punctate. Length 9—10 mm.

Batavia, N. Y., July 22. Hamilton records it from Indiana without definite locality. Known from Massachusetts and Canada west to Wisconsin, Colorado and Manitoba, south to Louisiana. Found also in Europe and western Siberia. Occurs mainly on willow and aspen. *L. geminatus* Say, recorded from Mass., and *L. colon* Linn., are probably synonyms, though Casey holds that *geminatus* is distinct from the European species in its more elongate form, much larger, more transverse and more strongly carinate thorax, stouter and more distinctly carinate beak and much sparser vestiture. Hamilton (1896, 122) admits that such differences do exist but asserts that "they are merely individual and apply equally well to the extremes of the individuals of either continent."

193 (——). Lepyrus alternans Casey, 1895, 823.

Oval, more robust than *palustris*. Black, sparsely clothed with grayish-white scales, more condensed along sides of thorax and elytra and usually in a small median spot on fourth interval. Beak as long as thorax, coarsely, closely and unevenly punctate, the median carina distinct. First and second joints of funicle equal. Thorax subconical, widest at middle, apex two-thirds as wide as base, disc finely and densely rugose-punctate, the median line entire. Elytra oval, their tips conjointly rounded, the narrow intervals depressed and more finely sculptured than the broader ones. Length 10—11.3 mm.

Known only from Maine and New Hampshire—Mt. Washington and vicinity. "Perhaps a geographical variety of the next." (*Hamilton.*)

194 (——). Lepyrus capucinus Schall., 1783, 283.

Elongate, robust. Black, sparsely clothed with gray and whitish scales not concealing the black surface; elytra without median spot, but with a white one on each apical protuberance. Beak longer than thorax, sulcate on each side of carina, densely and unevenly punctate. Thorax

wider than long, apex one-fourth narrower than base; disc closely covered with granuloid tubercles which are small above, larger and rugose on the sides; median carina fine, reaching the base. Elytra oval, one-half longer than wide; striæ deep, narrow; intervals tuberculate as thorax, tips conjointly rounded. Mesosternum, elevated between the coxæ. Length 9—11.2 mm.

A European species recorded by Hamilton as occurring in Michigan.

L. gemellus Kirby, described from Alaska, having the thorax as long as wide, coarsely granulate, strongly carinate, elytra without antemedian pale spot, but with a line of white hairs along the striæ, intervals coarsely rugose, alternating strongly in width and feebly in convexity; length 12.5 mm., has been recorded from the Hudson Bay Region of Canada.

IV. Listronotus Jekel, 1864. (Gr., "smooth" + "back.")

Medium sized, usually dirty brown species, 5 or more mm. in length, having the ocular lobes of thorax prominent, partly concealing the eyes in repose; first, second and fifth ventral segments long, third and fourth very short; legs slender, tibiæ bent inward at tip and rather strongly mucronate. Male with first and second ventrals more or less flattened and concave, and anal segment often so convex as to project behind the last ventral and become visible from beneath; female with elytra often either subacute or more or less prolonged at tip, and with fifth ventral often impressed or otherwise modified. All the species whose habits are known breed in semiaquatic plants and many of them are readily attracted by light. For convenience our Eastern species are separated into two groups as follows:

KEY TO GROUPS OF EASTERN SPECIES OF LISTRONOTUS.

a. Funicle of antennæ slender, third joint distinctly longer than fourth; second joint two or three times longer than first; length 7—14 mm. Group I.

aa. Funicle less slender, the third and following joints rounded, subequal; second joint three times as long as first; subapical callus of elytra feeble or obsolete; length usually less than 8 mm. Group II.

Group I.

This group comprises our larger species and the ones in which the secondary sexual characters of the female are most strongly developed, that sex being much easier to determine than the male. For example, the males of *caudatus* are very similar to those of *callosus* and are distinguished only by the feeble callus near the elytral declivity, whereas the females of the two species are easily

separable by the form of the elytral tips and the different impression of the last ventral.

KEY TO SPECIES OF GROUP I.

a. Subapical callus of elytra distinct, more or less prominent.
b. Tips of female elytra separately prolonged into a cylindrical process; length 7—8 mm.
c. Beak nearly cylindrical, not or feebly carinate; thorax as wide as long. 195. TUBEROSUS.
cc. Beak distinctly carinate and feebly sulcate above; thorax one-fourth wider than long. 196. SORDIDUS.
bb. Tips of female elytra separately subacuminate, not prolonged; length 8.5—11 mm.
d. Humeri rounded, base of elytra feebly emarginate; last ventral of female with two elevated folds near tip. 197. SQUAMIGER.
dd. Humeri oblique, base of elytra deeply emarginate, their sides paler than disc; last ventral of female with large rounded median impression. 198. CALLOSUS.
aa. Subapical callus of elytra indistinct, not at all prominent.
e. Elytra obliquely declivous behind; female with vertical edge of fifth ventral not foveate.
f. Sides of thorax feebly rounded.
g. Humeri rounded; female with elytra separately prolonged at tip into straight tapering processes and fifth ventral with lobes exactly as in *squamiger;* length 7—10 mm. 199. INÆQUALIPENNIS.
gg. Humeri oblique; female with apical processes of elytra cylindrical, converging at tip, and fifth ventral broadly but feebly concave; length 10—12 mm. 200. CAUDATUS.
ff. Sides of thorax strongly rounded; length 7.5 mm. 201. ROTUNDICOLLIS.
ee. Elytra compressed and vertical behind; female with margin of fifth ventral bifoveate each side of median apical notch; length 14 mm. 202. AMERICANUS.

195 (8441). LISTRONOTUS TUBEROSUS Lec., 1876, 130.

Black, densely clothed with brownish-yellow and cupreous rounded scales, which are larger on thorax and hair-like on head; thorax with three more or less distinct pale stripes; scutellum pale; elytral scales uniform in color; hind thighs with pale band. Beak stout, its carinæ and grooves very faint, frontal fovea feeble. Thorax with sides nearly parallel, disc densely punctate. Elytra at base broadly emarginate, humeri oblique; posterior callus large, conical, prominent; striæ punctate, intervals wide, nearly flat, their setæ very short. First ventral of male flattened at base, anal segment protuberant beyond the fifth, elytra rounded at tip. Last ventral of female feebly impressed near tip; each elytron prolonged at tip into a long, straight but convergent process. Length 7—7.5 mm.

Laporte and Marion counties, Indiana, scarce; June 9—Sept. 15. Taken from the margins of ponds and along the beach of Lake

Michigan. Ithaca, N. Y., April 8. Occurs from Quebec, New York and Michigan to Georgia; usually on sandy and muddy ground near water. Often taken by sweeping aquatic plants like *Sagittaria* and *Carex*. The median carina of beak is evident after the scales are removed, and the "scattered black dots" mentioned by LeConte as occurring on the thorax of this and other species are only open punctures from which the scales, which form a sort of lid, have been lost.

196 (8440). LISTRONOTUS SORDIDUS Gyll., Schn., 1834, 280.

Form and size of *tuberosus*. Color darker, the gray and fuscous scales more predominant. Thorax slightly wider than long, sides broadly rounded, disc densely punctate, its scales darker than those on sides. Elytra as in *tuberosus*, the intervals feebly convex. Female with last ventral feebly grooved near apex and elytra separately prolonged into short, straight processes. Length 7.5—8 mm.

Porter and Laporte counties, Indiana, scarce; June 19—Sept. 15. Dorchester, Mass., April 30—June 30. Ranges from Ontario and New England to Lake Superior, south to Georgia and Texas. The elytra are separately, not conjointly prolonged at tip, as stated by LeConte, the processes being much shorter and not convergent as in *tuberosus*.

197 (8442). LISTRONOTUS SQUAMIGER Say, 1831, 11; ibid, I, 271.

Elongate-oblong. Black, densely clothed with dirty gray or fuscous scales; thorax of fresh specimens with an oblique stripe of cupreous gray scales on the upper sides. Beak twice the length of head, its median carina distinct, entire, the two on each side forming the sulci shorter, feeble. Thorax slightly longer than wide, sides scarcely rounded, ocular lobes prominent, disc densely and finely punctate. Elytra subtruncate at base, intervals each with a single row of short gray setæ which are more prominent on the declivity; alternate intervals somewhat elevated; subapical callus oblong, not prominent, passing imperceptibly into the fifth interval. Last ventral of female with two strongly elevated folds at the tip, converging toward the front, but not meeting, presenting the appearance of a deep excavation. Length 8.5—9.7 mm.

Northern half of Indiana, scarce; not taken south of Marion County; April 10—August 15. Dorchester, Mass., June 3—July 25. Occurs along the margins of lakes and ponds, the larvæ living in the stems of the broad-leaved arrowhead, *Sagittaria latifolia* Willd. Ranges from Quebec and New Jersey to Illinois, south to Georgia, Arkansas and Louisiana.

198 (8443). LISTRONOTUS CALLOSUS Lec., 1876, 130.

Black, densely clothed with dirty brownish-yellow and grayish scales,

the latter forming a broad pale stripe along the sides of the thorax and elytra, and a narrow median dorsal line on the former. Beak as long as thorax, distinctly carinate above and sulcate on the sides. Thorax slightly longer than wide, broadly rounded on the sides, gradually narrowed in front of middle. Elytra strongly emarginate at base; striæ coarsely punctured; intervals wide, somewhat convex; subapical callus as in *squamiger*. First and second ventrals of female with a broad shallow impression, the last ventral with a deep, round excavation extending from base to tip. Last ventral of male not impressed, the anal segment very slightly visible behind it. Length 9—10.5 mm.

Not yet recognized from Indiana. LeConte gives its range as New York to Georgia. Known also from Ontario, District of Columbia, New Jersey, Michigan, Illinois and Louisiana.

199 (8444). LISTRONOTUS INÆQUALIPENNIS Boh., Schn., 1842, 189.

Elongate-oblong, rather slender. Black, densely clothed with fuscous scales; thorax with a stripe of gray scales each side. Beak as long as head and thorax, feebly carinate. Thorax as wide as long, sides almost straight; disc densely and finely punctate. Elytra subdepressed, finely striate, the striæ with small distant punctures; alternate intervals more elevated and connected by a few remote, coarse, transverse wrinkles; subapical callus almost obsolete. Male with first and second ventrals broadly concave at middle, anal segment convex and protruding behind the last ventral, elytra conjointly rounded. Female with tips of elytra separately prolonged, the processes short, straight, tapering. Length 7—10 mm.

Lake, Laporte and Marion counties, Indiana, scarce; May 23—July 29. Taken on mud flats. Wallingford, Conn., July 14. LeConte records it from "Middle and Southern States." Known from New York, Pennsylvania, Ohio, Wisconsin, New Jersey and District of Columbia.

200 (8445). LISTRONOTUS CAUDATUS Say, 1823, 311; ibid, II. 174.

Elongate-oblong, robust. Black, densely clothed with brownish-yellow scales; head, beak, sides of thorax and some scattered spots along the sides of elytra, paler; antennæ reddish-brown. Beak longer than thorax, finely carinate above, the sulci on sides semi-obsolete. Thorax wider than long, sides subparallel, feebly curving near apex; disc finely and densely punctate. Elytra strongly emarginate at base, sides parallel, suddenly strongly narrowed one-fourth from apex; disc subdepressed, striæ fine, minutely punctate; intervals flat and usually without transverse wrinkles, each with a row of minute setæ. Male with anal segment slightly visible; elytra conjointly rounded at tip. Female with elytral processes cylindric, incurved at tip, not or slightly tapering. Length 10—12 mm.

Frequent throughout Indiana, May 25—October 12; mating June 20. Dorchester and West Roxbury, Mass., April 18—Aug. 17. Ranges from Canada, New England and District of Colum-

bia, west to Iowa and Missouri. Recorded as occurring on the mild smartweed, *Polygonum hydropiperoides* Michx., and also on arrow-head. The oblique humeri, deeper emarginate base and more robust form separates this from the preceding.

201 (8447). Listronotus rotundicollis Lec., 1876, 132.

Blackish, covered with dirty brown scales, those of sides of thorax paler. Beak feebly carinate, lateral grooves almost obsolete, frontal fovea distinct. Thorax as wide as long, sides strongly rounded, disc densely and coarsely punctured. Elytra with deep punctured striæ; intervals convex, their setæ rather conspicuous. Last ventral of female with a large shallow rounded impression, the elytra conjointly rounded at tip. Length 7.5 mm.

The above is LeConte's description of the type female from Georgia. Another is in the Horn collection from Louisiana. Not recorded elsewhere.

202 (8446) Listronotus americanus Lec., 1876, 131.

Blackish, covered with round, dirty brown scales, which are larger on thorax, less dense and hair-like upon the head and beak; thorax with two sinuous lateral vittæ and a narrow dorsal line of paler scales; sides of elytra also pale. Beak as long as thorax, strongly carinate and sulcate. Thorax scarcely as long as wide, rounded on the sides, narrowed before the middle, coarsely and densely punctate. Elytra strongly emarginate at base, humeri oblique, sides parallel, compressed at the suture near tip and vertically declivous; posterior callus distinct, not prominent. Female with last ventral deeply concave, narrowly and deeply emarginate at tip and with two excavations on apical edge each side of the emargination; tips of elytra separately rounded. Length 14 mm.

Described by LeConte from three females taken in Georgia and without other records. The large size and the peculiar sculpture of the last ventral, should make it easily recognizable. Two of the types are at Cambridge, the other at Philadelphia.

Group II.

The species of this group average much smaller, some of them being but little if any larger than the largest *Hypercodes*. The secondary sexual characters are also feebly developed, the female elytra being rarely prolonged at tips and last ventral in most species scarcely or not at all impressed.

KEY TO SPECIES OF GROUP II.

a. Head clothed with hair-like scales; beak slightly flattened above, usually more or less carinate and sulcate.

b. Thorax distinctly longer than wide (except in female of *frontalis*).

c. Scales of thorax not larger than those of elytra; tips of female elytra not prolonged; length 6—9 mm.

d. Beak stout, strongly carinate and sulcate; thorax with larger and smaller punctures intermixed. 203. SULCIROSTRIS.

dd. Beak more slender, slightly carinate and sulcate.

e. Frontal fovea obsolete; form more elongate. 204. NEBULOSUS.

ee. Frontal fovea deep; form less elongate; disc of thorax, at least of female, with median impression on apical third. 205. FRONTALIS.

cc. Scales of thorax distinctly larger than those of elytra; tips of female elytra separately prolonged; length 4.2—6.5 mm. 206. APPENDICULATUS.

bb. Thorax not longer than wide, deeply, coarsely and densely punctured.

f. Sides of thorax broadly rounded.

g. Scales of thorax much larger than those of elytra; tips of female elytra separately acuminate or slightly prolonged.

h. Thorax as wide as long; scales of elytra uniform yellowish; last ventral of female not impressed; length 5.5—6 mm. 207. FLORIDENSIS.

hh. Thorax distinctly wider than long; scales gray or fuscous; last ventral of female with a broad deep impression; length 6.2—8.5 mm. 208. PALUSTRIS.

gg. Scales of thorax not or but slightly larger than those of elytra; tips of elytra in both sexes conjointly rounded; last ventral of female not or feebly impressed.

i. Beak subcylindrical, feebly carinate and sulcate; frontal fovea faint.

j. Scales of upper surface mostly dirty brown, but more or less varied in hue, giving the elytra a mottled appearance; intervals feebly convex. 209. LATIUSCULUS.

jj. Scales of entire upper surface with a reddish or coppery tinge; elytral intervals flat. 210. RUDIPENNIS.

ii. Beak strongly carinate and sulcate; frontal fovea deep. 211. IMPRESSIFRONS.

ff. Sides of thorax strongly rounded; length 6.7 mm. 212. CRIBRICOLLIS.

aa. Head clothed with rounded scales; length 5—5.7 mm.

k. Setæ long and clavate; thorax with scales larger than those of elytra, its sides strongly rounded, not sinuate. 213. SETOSUS.

kk. Setæ of ordinary length; thorax with scales not larger than those of elytra, its sides broadly rounded, feebly sinuate at middle. 214. DEBILIS.

203 (8449). LISTRONOTUS SULCIROSTRIS Lec., 1876, 132.

Elongate-oval. Black, rather sparsely clothed with small, rounded, dirty-brown scales. Antennal club indistinctly annulate, its basal joint very large. Beak stouter than usual, with the ridges and grooves prominent, so as to appear tricarinate and quadrisulcate. Thorax with sides straight to beyond middle, thence gently converging to apex; disc densely and

unequally punctate, the larger punctures well scattered. Elytra broadly emarginate at base, humeri rounded; tips conjointly rounded in both sexes; striæ marked with coarse, distant punctures, intervals slightly convex. Last ventral of female with a broad, feeble impression. Length 7.5—8 mm.

Ormond and St. Augustine, Florida; April 6. Recorded from Georgia, District of Columbia and Ohio. Reported also from Ontario.

204 (8450). LISTRONOTUS NEBULOSUS Lec., 1876, 133.

Elongate-oblong, subparallel. Blackish, thickly clothed with mottled brown and dark scales, those on head cupreous; thorax with a bifurcated lateral stripe and a median dorsal line paler. Thorax with sides almost parallel for two-thirds their length, thence more rounded to apex; discal punctures equal, dense, deep. Elytra one-fourth wider than thorax, strongly emarginate at base, humeri short, oblique, or feebly rounded; striæ strongly punctured; intervals wide, flat, each with a row of minute yellowish inclined setæ. Length 7.8—9.5 mm.

Lake County, Indiana, rare; July 27. Described from Missouri. Recorded from New Jersey, Iowa, Kansas and Florida; common in Louisiana and Texas. Easily known by the parallel form and mottled color.

205 (8451). LISTRONOTUS FRONTALIS Lec., 1876, 133.

Oblong-oval. Blackish; elytra thickly clothed with small, rounded, dirty brown scales, those of head and thorax more or less cupreous; antennæ and tarsi reddish-brown. Beak slender, subcylindrical, scarcely longer than thorax, with three fine carinæ, the grooves on sides almost obsolete. Thorax as long, female, or slightly longer, male, than wide, sides broadly rounded, disc finely and densely puncate. Elytra one-third wider than thorax, feebly emarginate at base, humeri rounded, sides slightly converging for three-fourths their length, then gradually narrowing to the conjointly rounded tips; striæ coarsely punctured, intervals flat, rather wide, each with a row of short setæ. Last ventral of female with three shallow impressions. Length 6—9 mm.

Lake, Steuben and Vigo counties, Ind.; June 10—July 27. Frequent along the beach of Lake Michigan and the borders of ponds and ditches. Sarasota, Fla., Feb. 25. Ranges from New England to Michigan and Iowa, south to Texas. The thorax is usually impressed near apex and in fresh specimens has a narrow median line and wider sinuous lateral stripes of silvery gray scales, the latter extending back on the humeri. The narrower body, subtruncate base of elytra and more prominent setæ, especially on the declivity, make it readily known.

206 (8448). LISTRONOTUS APPENDICULATUS Boh., Schn., 1842, 192.

Elongate, slender. Piceous, densely clothed with yellowish scales, those of thorax round, much larger and more sparse than those of elytra, the ones on sides paler; antennæ and tarsi reddish-brown; elytra each with a curved blackish mark near middle on third interval. Beak scarcely as long as thorax, flattened and with an indistinct median carina above. Thorax distinctly longer than wide, ocular lobes prominent, in repose completly hiding the eyes; sides feebly rounded, disc densely and rather coarsely punctate. Elytra twice as long as wide, feebly emarginate at base, sides parallel to near apex; striæ fine, their punctures small; intervals flat, the setæ very short, recurved; tips conjointly rounded in male; separately produced into a short, straight process in female. Length 4.2—6.5 mm.

Lake County, Indiana, rare; July 27. Pawpaw Lake, Michigan, July 19. Ranges from New York and Canada to Texas. Quite common in winter about New York in sifting. Julich found it breeding in the stems of reeds, and Webster has recorded it as attacking cabbages in Ohio, "gouging out great cavities from the stems of the young plants and later attacking the bases of the larger leaves from beneath."* This is the only record of these snout beetles being injurious which we can find. However, since all species of *Listronotus* occur only about moist places, where they live upon semiaquatic plants, it follows naturally that when the land is drained and their native food plants destroyed they will attack the cultivated crops, and what has heretofore been regarded as a harmless insect may suddenly become a very injurious one.

207 (——). LISTRONOTUS FLORIDENSIS sp. nov.

Elongate-oblong, more robust than *appendiculatus*. Color nearly as there, the thorax without the lateral pale scales. Beak stouter, broadly grooved above for its full length, the median carina obsolete except near tip. Thorax as wide as long, sides broadly rounded. Elytral striæ wider, the punctures much coarser; intervals obviously convex. Tips of female elytra separately acuminate, not prolonged in processes as in *appendiculatus*. Length 6—6.2 mm. (*W.S.B.*)

Lake Worth, Lake Okeechobee and Dunedin, Fla., Feb. 14—March 8. Four males, two females. The much broader thorax, absence of median carina of beak and widely different tips of female elytra distinguish this from *appendiculatus* which it otherwise closely resembles.

* Insect Life, VII, 206.

208 (——). Listronotus palustris sp. nov.

Elongate-oblong, robust. Black, above rather thickly clothed with pale brown, fuscous and silvery gray scales, the gray ones forming a narrow stripe each side of thorax and along the sides to beyond the middle of elytra, covering also the meso- and metasternal side pieces and sides of ventral segments, and forming a ring near apex of each femur; antennæ, tibiæ and tarsi dark reddish-brown. Beak rather stout, as long as thorax, distinctly tricarinate and quadrisulcate. Thorax short, convex, distinctly wider than long, sides broadly rounded, disc coarsely, evenly and densely punctured, each puncture closed by a round scale, much larger than those of elytra. Scutellum small, rounded. Elytra but slightly wider at base than middle of thorax, humeri oblique, sides subparallel to apical third, then strongly converging to apex where they are conjointly rounded in male, but separately prolonged in short, obtuse processes in female; striæ with very coarse punctures separated by their own diameters; first, third and fifth intervals convex, slightly elevated, the others flat; setæ very short, visible only on the declivity. Fifth ventral of female broadly and deeply impressed. Length 6.2—8.5 mm. (*W.S.B.*) (Fig. 60.)

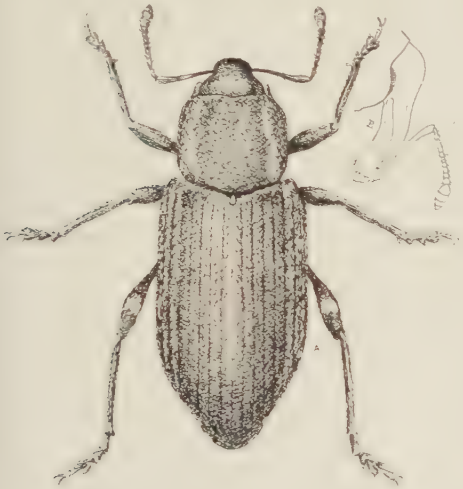


Fig. 60. *a*, Adult, × 7; *b*, side view of head and beak, showing postocular lobes almost concealing the eye. (Original.)

Dunedin, Florida, Jan. 17—April 6; common beneath boards and other cover along the margins of ponds; mating Feb. 11 and April 1. Enterprise, Fla., May 25; LeConte collection without name. Marion County and Enterprise, Fla., May 27; Horn collection, without name. Specimens sent to Dr. Chittenden were returned as *L. sulcirostris* Lec., but careful comparison with the type of that species shows *palustris* to differ widely in the secondary sexual characters of female, as well as in the width, vestiture and punctuation of thorax.

209 (8453). Listronotus latiusculus Boh., Schön., 1842, 199.

Oblong. Black, clothed with dirty brown, fuscous and grayish scales, those of thorax slightly larger than on elytra and in part with a cupreous tinge; the gray ones forming three faint stripes on thorax and some mottlings on sides of elytra; antennæ and tarsi reddish-brown. Beak slender, slightly longer than thorax, feebly tricarinate. Thorax subquadrate, narrower in front, feebly impressed near apex, subdepressed and densely punctate above. Elytra at base one-half wider than thorax, feebly

emarginate, humeri rounded, scarcely prominent; sides parallel, narrowed toward tips, striæ fine, the punctures rather coarse; intervals even, each with a row of short, pale setæ. Length 5—6 mm. (Fig. 61.)

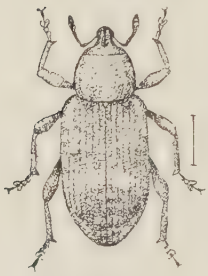


Fig. 61, × 5. (After Chittenden.)

Putnam and Franklin counties, Ind., scarce; April 11—June 11. Beaver Dam, Wis., May 26. Ithaca, N. Y., June 25. Ormond and Dunedin, Fla., March 22—Dec. 23. The above is a description of the specimen bearing the label *latiusculus* in the LeConte collection. Of it he said: "I refer this name to a species which occurs in the Middle or Southern States, and is by no means rare." The type was from Pennsylvania. Ranges from Quebec, New England and Michigan, west and south to Colorado, Kansas and Georgia. Breeds in the stalks and seed heads of the broad-leaved arrowhead, *Sagittaria latifolia* Willd., the eggs being laid in bunches of five to ten on the leaf stalk, and covered with bits of epidermis chewed up by the mother beetle.* Known also as the "parsley-stalk weevil," the larvæ boring in the roots and stems of parsley causing the tops to turn yellow and wilt. Bisulphide of carbon or kerosene emulsion applied about the roots will serve as a remedy.*

210 (——). LISTRONOTUS RUDIPENNIS sp. nov.

Elongate-oblong. Black, above densely clothed with round reddish-yellow scales having a more or less pronounced coppery tinge, those of thorax slightly larger than on elytra, distinctly concave and ocellate; antennæ and legs reddish-brown. Beak slender, subcylindrical, as long as head and thorax, finely carinate at middle, not sulcate, frontal fovea evident but shallow. Thorax short, as wide as long, sides feebly rounded, disc finely and densely punctate. Elytra at base one-third wider than thorax, humeri oblique, sides parallel to apical fourth, then feebly converging to the obtusely rounded apex; striæ fine, their punctures small, rather distant; intervals wide, flat, each with a row of minute white setae, the fifth with evident callus at declivity. Under surface and legs rather thickly clothed with scale-like cupreous hairs. Length 5.8—6.3 mm. (*W. S. B.*)

Lake County, Indiana, May 3—June 10. Oregon, Illinois; Pawpaw Lake, Mich., and St. Louis, Mo., July 8—August 1; Liljeblad collection. LeConte collection from Indiana, labeled erroneously *L. sulcirostris*. Comparatively longer and more robust than *latiusculus* with the scales all paler and uniform in color, those of thorax more distinctly ocellate; humeri more oblique and intervals all flat.

*Ins. Life, III, 83; Bull. 82, U. S. Bur. Ent., 1909, 19.

211 (8455). Listronotus impressifrons LeConte, 1876, 134.

Form and size of *latiusculus*. Scales mostly dirty brown, the elytra not mottled as there; thorax with a narrow pale stripe each side. Beak wider, stouter, much more distinctly carinate and sulcate, sparsely covered with large rounded scales intermingled with slender, hair-like ones. Frontal fovea large, deep. Sides of thorax broadly rounded, disc densely and coarsely punctured. Elytra more than one-half broader at base than thorax, intervals feebly convex. Last ventral of female not impressed. Length 5.5—5.8 mm.

Described from Georgia and Louisiana. Quite common about Lake Okeechobee, Fla., March 2—8, among and beneath the decaying stems of the water hyacinth, *Piaropus crassipes* Mart., next to the water's edge; also at Dunedin, Jan. 9—March 31.

212 (8454). Listronotus cribricollis Lec., 1876, 134.

Also of the form, color and sculpture of *latiusculus*. Thorax distinctly wider than long, more strongly rounded on sides, distinctly constricted near tip, so that looking from above the postocular lobes appear more prominent; humeral angles of elytra more distinctly oblique. Last ventral of female with a large rounded impression, the bottom of which is shining and nearly smooth. Length 6.7 mm.

Such is LeConte's description of his single female type from Georgia. No other record can be found.

213 (8456). Listronotus setosus Lec., 1876, 134.

Oblong. Black, above densely covered with round, dirty gray, fuscous-brown and silvery white scales, which are larger on the thorax and not hair-like on the head; the fuscous ones forming a few irregular blotches along the sides and a large one near the apex of elytra; the silvery ones a narrow median line and a sinuous stripe each side of the thorax and a few spots on sides of elytra; antennæ, tibiæ and tarsi reddish-brown; femora blackish with a ring of silvery scales near apex. Beak rather slender, longer than thorax, the median and lateral carinæ evident but weak. Thorax short, distinctly wider than long; sides rounded, strongly so near base and apex; ocular lobes prominent, disc densely and coarsely punctate. Elytra one-fourth wider at base than thorax, base broadly and feebly emarginate; humeri rounded, striæ rather finely punctate; intervals feebly convex, each with a row of rather long, inclined, club-shaped blackish bristles. Last ventral with a rounded shallow impression near tip in male, and a very deep median cavity on apical half in female. Length 5—5.5 mm.

Sarasota and Dunedin, Fla., Jan. 18—Oct. 25; frequent beneath boards along the margins of ponds and on the flowers of *Sagittaria*. Recorded by Pierce (1907, 259) as occurring on cotton at Victoria, Texas, May 23. Ranges from Georgia to Texas.

214 (——). LISTRONOTUS DEBILIS sp. nov.

Oblong, rather robust. Black, above and under surface, except abdomen, densely clothed with a crust of small, round, dirty white scales, each with a minute golden dot at center; antennæ, tibiæ and tarsi reddish-brown; femora piceous, densely scaly near apex. Beak slender, subcylindrical, as long as head and thorax, naked, feebly carinate and slightly widened on apical third, not carinate and densely scaly behind the antennæ; frontal fovea large, deep. Thorax slightly wider than long, sides broadly rounded, feebly but distinctly sinuate at middle, disc densely and finely granulate-punctate. Elytra at base one-third wider than middle of thorax, humeri rounded, sides parallel to apical fourth, then converging to the conjointly rounded apex; striæ very fine, their punctures concealed; intervals wide, flat, each with a row of short, white inclined bristles. Length 5.5 mm. (*W. S. B.*)

Putnam and Vigo counties, Ind., rare; June 12—July 1. A unique form, easily known by the peculiar color of scales, sinuate thorax and scaly head. The last ventral is not impressed in either of the two specimens, both of which are probably males.

IV. HYPERODES Jekel,* 1864. (Gr., Hypera + "like.")

Small oblong or elongate-oval species having the eyes lateral, not encroaching on the front; beak deflexed, narrower than head, slightly widened at tip and with one or more carinæ on its upper face; antennæ inserted near tip of beak, their grooves deep in front and visible from above, directed against the eyes, usually shallow and more or less widened behind; scape clavate, reaching the eye, first joint of funicle always stouter than second, the two usually sub-equal in length, 3—6 of almost equal width, seventh wider; thorax never longer than wide, ocular lobes distinct; scutellum small; elytra oblong-oval, wider than thorax, usually emarginate at base, slightly narrowed toward apex; femora clavate. Males with the third joint of tarsi moderately dilated, and the last ventral subtruncate; females with the last ventral broadly rounded, usually more or less impressed.

Like the species of *Listronotus*, they occur beneath cover on sandy or muddy ground near water, or upon semi-aquatic plants. They probably feed upon such plants, though the life history of no species is recorded. Up to the present they may, therefore, be termed innocuous rather than injurious to agriculture. The only paper treating of the North American species as a whole is by

Dietz, Wm. G.—"On the Species of Macrops Inhabiting North America," *in* Trans. Am. Ent. Soc., XVI, 1889, 28—54.

In it 33 species are described from the United States. Of these 18 occur in the territory covered by this paper, while four

*This name takes the place of *Macrops* Kirby which was preoccupied in Reptilia.

others are described as new. The genus is one of the most difficult of the subfamily, the species being very similar in form, size and color. For convenience our species are first separated into four groups.

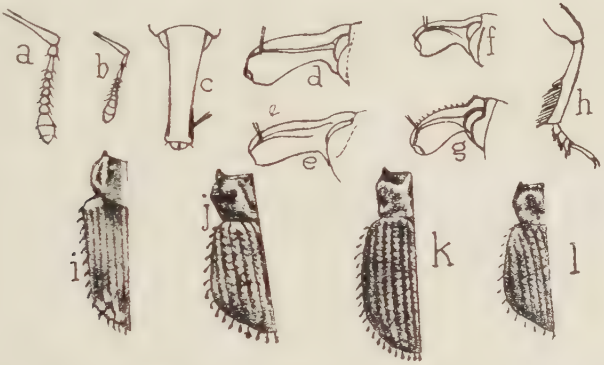


Fig. 62. Structures of *Hyperodes; a,* Antenna of *H. solutus* showing elongate second joint of funicle; *b,* antenna of *Hyperodes sp.* showing first and second joints of funicle subequal; *c,* front view of head of *H. dorsalis; d,* same seen from the side; *e,* view of head of *H. delumbis; f,* same of *H. sparsus; g,* same of *H. echinatus; h,* hind tibia of male of *H. delumbis; i,* thorax and elytra of *H. rotundicollis; j* and *k,* same of *H. hornii,* male and female; *l,* same of *H. setiger,* male. (After Dietz.)

KEY TO GROUPS OF EASTERN HYPERODES.

a. Second joint of funicle slender and one-half longer than first, the latter stout, somewhat top-shaped (Fig. 62, *a.*); all the tarsi stout, their third joint dilated, bilobed, last joint shorter than the others combined. GROUP I.

aa. First and second joints of funicle equal or nearly so. (Fig. 62, *b.*)

b Beak more slender, about as long or longer than thorax; antennal grooves narrow, sharply defined and but slightly expanded behind. (Fig. 62, *c., d.*) GROUP II.

bb. Beak stouter, shorter than thorax, generally flattened above; antennal grooves widened and ill defined behind (except *porcellus*). (Fig. 62, *e., f., g.*)

c. Upper surface scaly, elytra not clothed with a fine hair-like pubescence. GROUP III.

cc. Upper surface more or less pubescent; front tarsi of male dilated; alternate intervals of elytra with a row of setæ. GROUP IV.

GROUP I.

The members of this group are closely allied to *Listronotus.* In addition to the characters above given they are rather densely covered with clay-yellow or grayish-brown scales, have the ocular lobes prominent, almost wholly concealing the eyes, and the front tibiæ incurved at apex, not toothed on the outer side.

KEY TO SPECIES OF GROUP I.

a. Elytral setæ very small, inconspicuous; thoracic punctures moderate.

b. Thorax with scales larger than those of elytra, its sides almost straight, each elytron usually with a large triangular blackish post-median spot. 215. SOLUTUS.

bb. Thorax with scales not larger than those of elytra, the sides distinctly rounded; elytra with a common broad black median bar. 216. DECEPTUS.

aa. Elytral setæ stout, very evident; thoracic punctures very coarse, cribrate. 217. CRYPTOPS.

215 (8469). HYPERODES SOLUTUS Boh., Schön., 1842, 197.

Elongate-oblong. Reddish-brown to piceous, above rather densely clothed with rounded, clay-yellow scales, those of thorax larger, paler and more dense on sides; elytra each with a large, irregular, triangular black spot just behind middle, its apex not quite reaching the suture; antennæ and legs reddish-brown, femora and club darker; under surface glabrous, piceous, the last two segments paler. Beak as long as thorax, its sides parallel and median carina fine but distinct. Thorax about as wide as long, sides almost straight, ocular lobes only partly covering the eyes in repose; disc densely, not coarsely punctate. Elytra convex, one-half wider than thorax, sides parallel for two-thirds their length, thence narrowed and compressed to apex; striæ fine, their punctures rather distant; intervals each with a row of short, whitish setæ. Last ventral of female with a shallow apical triangular fovea. Length 3—5 mm.

Frequent throughout Indiana, May 29—July 9. Mating June 20 and both the typical form and the variety *indistinctus* taken together in numbers July 9 on arrow-arum, *Peltandra virginica* L., so that may be one of its food plants. Locally common on the arrow-head, *Sagittaria*, near New York City, and also taken in winter by sifting. Ranges from Canada and New England to Montana, south to District of Columbia and Kansas.

An examination of the types of *Macrops indistinctus* Dietz shows that the thorax is not wider than long, the relative dimensions being as in many specimens of *solutus*, and in our opinion it is only a color variety of that species, in which the black spots of elytra are wanting. As pointed out by Dietz, this form without black spots may be Boheman's *spurcus*. If so, the name *spurcus* has priority and *solutus* becomes the variety. The type of *spurcus* was from Boston but Boheman's description is insufficient. In the LeConte collection are two specimens labelled "*spurcus?*" One is *sparsus* as recognized by Dietz, the other the *echinatus* of Dietz. A careful examination of the type of *spurcus* is necessary to fix the status of that species.

216 (——). Hyperodes deceptus sp. nov.

Elongate-oblong. Dark reddish-brown to black; above densely clothed with pale brown, fuscous and grayish-white scales, the whitish ones forming an indistinct narrow median line and two broad lateral stripes on thorax, also covering the humeri and most of the declivity of elytra and forming a ring near the tip of femora, the fuscous ones clothing the median portion of thorax and forming a broad common cross-bar on elytra at or just behind the middle; antennæ and tibiæ paler reddish-brown, the club and tarsi dusky; under surface with large, sparsely placed silvery white scales, these absent on the last three ventrals. Second joint of funicle one-half longer than first; eyes hidden in repose by the ocular lobes. Beak as in *solutus*, the median carina very fine. Thorax subglobose, slightly wider than long, sides broadly rounded, incurved at base which is narrower than apex, disc finely and densely punctate. Elytra at base one-third wider than thorax, humeri rounded, sides parallel to apical fourth; striæ fine, their punctures concealed; intervals feebly convex, their setæ very small. Last ventral of female feebly impressed at tip. Length 3.2—4 mm. (*W.S.B.*)

Lake County, Ind., rare; May 25—June 10. Allied to *solutus* but very distinct in the form of thorax and coloration. The smaller of the two specimens has the under surface and femora black, the black cross-bar of elytra wider and more median and the last ventral unmodified.

217 (10,816). Hyperodes cryptops Dietz, 1889, 32.

Elongate-oblong, robust. Dark reddish-brown to piceous, sparsely clothed with rounded, grayish-yellow scales; thorax often with a narrow median and lateral line of paler scales; antennæ and legs reddish-brown. Beak stout, as long as thorax, median carina visible only near tip, its usual location occupied by a broad, shallow sulcus. Eyes large, almost covered in repose by the ocular lobes. Thorax subquadrate, slightly wider at base than apex; sides almost straight on basal three-fourths, then slightly narrowed to apex; disc very coarsely and deeply punctate, punctures separated by narrow ridges and each covered by a large, round, concave scale. Elytra one-half wider than thorax, convex, parallel for three-fourths their length, then gradually narrowed to the conjointly rounded tips; striæ rather broad, well impressed, their punctures subquadrate, close-set; intervals feebly convex, each with a row of stout white subclavate setæ. Metathorax and first ventral coarsely, reticulately punctate. Length 4—5 mm.

Dunedin and Arch Creek, Fla., scarce; Jan. 19—April 8; beneath boards in damp places; on the flowers of *Sagittaria* and swept from huckleberry. Described from Georgia and Florida. Easily known by the large ocular lobes and very coarsely punctate thorax.

Group II.

With the exception of the last two, our species of this group have the form subdepressed; beak rather slender, tapering more or less distinctly from the base to the insertion of the antennæ and

somewhat compressed at tip (Fig 62, *c*); ocular lobes feeble; tibiæ finely toothed and with setæ along the inner margin; front tarsi of male dilated.

KEY TO EASTERN SPECIES OF GROUP II.

a. Elytral intervals wider than the punctures; sexes alike in form.
b. Larger, 4.2 mm. or more in length; no distinct ridge or sulcus above the eye.
c. Tarsi fringed with long flexible hairs without stiff bristles; tibiæ slender; elytra almost uniform grayish-brown. 218. GRYPIDIOIDES.
cc. Tarsi fringed at sides with stiff, bristle-like hairs, intermixed with short pubescence; elytra distinctly variegated with pale brown. 219. DORSALIS.
bb. Smaller, not over 3.8 mm. in length; antennal grooves deep, their upper margin prolonged as a superciliary ridge.
d. Alternate elytral intervals more prominent and they alone bearing setæ on disc of elytra.
e. Thorax nearly twice as wide as long, its sides almost straight, sinuate at middle. 220. ALTERNATUS.
ee. Thorax but slightly wider than long, its sides broadly rounded. 221. PENINSULARIS.
dd. Elytral intervals all equal in width and elevation, each with a row of short, suberect setæ. 222. MONTANUS.
aa. Elytral intervals narrow, their punctures large, foveiform; sexes dissimilar in form.
f. Larger, 4 mm.; thorax impressed at middle and constricted at apex. 223. HORNII.
ff. Smaller, 3 mm.; thorax without median impression, gradually narrowed to tip. 224. SETIGER.

218 (10,819). HYPERODES GRYPIDIOIDES Dietz, 1889, 35.

Oblong, convex. Piceous, above thickly clothed with grayish-brown and silvery-white scales, the latter forming an interrupted median line and two very narrow sinuous stripes on thorax, a blotch on humerus and a few indistinct mottlings on sides of elytra; under surface of thorax and mesosternal side pieces also covered with white scales; antennæ, tibiæ and tarsi reddish-brown. Beak slightly longer than thorax, very slender, finely tricarinate. Thorax one-half broader than long, sides strongly rounded, apex feebly constricted, two-thirds as wide as base; ocular lobes very narrow, the eyes uncovered in repose. Elytra at base one-fourth wider than thorax at middle, humeri rounded, prominent; striæ fine, their punctures small, rather distant; intervals feebly convex, each with a row of short, slender, white setæ. Third tarsal joint twice as long as second. Last ventral of male with a shallow triangular impression; of female with a deep longitudinal one on apical half. Length 4.2—4.5 mm.

Lake County, Indiana, rare; May 30—June 20. Dietz's types were from Kansas, Nevada, Texas and Wyoming. His types of *wickhami* from New Mexico are not distinguishable.

219 (10,824). Hyperodes dorsalis Dietz, 1889, 37.

Oblong, rather robust. Piceous, densely clothed above and beneath with gray and pale brown scales, the gray ones forming three distinct stripes on thorax, the middle one narrow; the brown scales arranged to form a broad discal stripe, reaching from base almost to apex of elytra, and a diagonal line extending from humerus towards the suture. Beak as long as thorax, tricarinate. Thorax more than one-half wider than long, base wider than apex, sides strongly rounded, disc densely punctate, and bearing numerous erect, club-shaped hairs in addition to the scales. Elytra one-fourth wider than thorax; striæ fine, feebly impressed; intervals almost flat, each with a row of clavate setæ. Under surface densely punctate. Last ventral of female deeply emarginate and with a deep, sharply defined lunate fovea. Length 4.5—5 mm.

Described from Illinois, Texas and Louisiana.

220 (10,826). Hyperodes alternatus Dietz, 1889, 38.

Oblong, subdepressed. Piceous-brown; densely scaly above, almost glabrous beneath, the scales matted together by a dirty brown crust, hiding the sculpture; antennæ and legs reddish-brown. Beak rather stout, as long as thorax, sharply tricarinate. Thorax nearly twice as wide as long, base rounded, not wider than apex, sides almost straight; disc densely and finely punctate. Elytra one-fourth wider than thorax, base subtruncate, parallel for two-thirds their length, then gradually narrowed to tip; striæ deep, punctures large, close-set; alternate intervals strongly elevated. Under surface closely and densely punctate. Length 3.5 mm.

Described from Illinois. Type in the Ulke collection at Pittsburg.

221 (——). Hyperodes peninsularis sp. nov.

Oblong. Piceous-brown, above densely clothed with dirty white and pale brown scales, the former condensed in a broad stripe each side of thorax and a narrow humeral one on elytra, the latter extending backward to near middle and curving inward to fifth interval; under side of thorax and a ring near apex of each femur, densely clothed with large ocellate silvery-white scales; antennæ and legs reddish-brown. Beak as long as thorax, narrower at middle, scarcely wider at base than apex, feebly tricarinate, densely scaly. Thorax less than one-fourth wider than long, disc coarsely and densely punctate, each puncture closed with a large round scale. Base of elytra one-third wider than middle of thorax, humeri rounded, sides straight for three-fourths their length; alternate intervals distinctly, not strongly more elevated, each with a row of rather long, white, inclined setæ. Under surface coarsely and densely punctate. Last ventral of male with a round impression near apex. Length 3.7 mm.

(*W. S. B.*)

Sanford, Fla., Apr. 4. The scales of thorax, both above and beneath, are distinctly larger than those of elytra.

222 (10,827). HYPERODES MONTANUS Dietz, 1889, 39.

Oblong. Dark piceous; surface above and that of thorax beneath densely clothed with white and grayish-brown scales, the pale ones forming three narrow stripes on thorax, and a humeral spot and numerous white mottlings on elytra; antennæ and legs reddish-brown. Beak slender, subcylindrical, slightly longer than thorax, obscurely tricarinate. Thorax two-thirds wider than long, wider at base than apex, sides moderately rounded; disc with a transverse impression behind apical margin, finely granulate, the punctures wholly concealed by the scales. Elytra at base scarcely one-fourth wider than thorax at middle; striæ deeply impressed, their punctures distant, concealed by the scales. Abdomen densely punctate. Last ventral of female with a small fovea near apex. Length 3.5 mm.

Lake and Dubois counties, Indiana, scarce; May 27—May 29. Described from Illinois, Kansas, Nevada, Dakota and Montana. The scales are often so concealed by a crust as to make their true color obscure.

223 (10,829). HYPERODES HORNII Dietz, 1889, 40.

Males ovate; females broadly oblong. Black, more or less densely clothed with dirty grayish-brown or piceous scales; antennæ, tarsi and apex of tibiæ reddish-brown; thorax usually with three narrow stripes and elytra with humeral spot, scutellum and scattered spots along sides of whitish scales. Beak of male subcylindrical, longer than thorax, median carina distinct, others feeble, densely and confluently punctate; of female, broader and stouter, subdepressed, not longer than thorax, strongly tricarinate. Thorax one-half wider than long, sides almost straight and diverging for two-thirds their length, then narrowed to and broadly constricted near apex; disc with broad median impression, coarsely, densely and deeply punctate. Elytra of male slightly wider at base than thorax, sides broadly rounded, widest behind the middle, then rather rapidly narrowed to tip; striæ very wide; intervals narrow, convex, each with a row of long, stout, club-shaped setæ. Elytra of female distinctly wider at base than thorax, not wider behind the middle. Under surface sparsely scaly, coarsely punctate; the last ventrals densely and finely punctured. Length 4—5.5 mm. (Fig. 62, *j*., male; *k*., female.)

Ormond, Lake Istokpoga and Dunedin, Fla.; Jan. 23—Dec. 23. Frequent at Dunedin beneath boards along the margin of ponds, mating on the latter date. Described from Georgia and Florida. The thorax is not channeled as stated by Dietz and the median impression is much less distinct in the female. In fresh specimens the beak and apical third of femora are clothed with silvery-white scales.

224 (10,830). HYPERODES SETIGER Dietz, 1889, 41.

"Differs from *hornii* in its smaller size, stouter and shorter tricarinate beak; thorax transverse, more than one-half wider than long, sides

broadly rounded, not constricted at tip, disc not channeled, obscurely impressed near base and apex. Setæ much more slender, scarcely conspicuous. Length 3 mm." (*Dietz.*) (Fig. 62, *l.*)

Described from a single male from Florida. The only specimen labelled *setiger* at Cambridge is notable for its pear-shaped body.

GROUP III.

The members of this group have the beak stout, slightly shorter than thorax, distinctly carinate above, often angulated at the sides, separated from the head by a shallow transverse impression; tarsi less slender, the front ones of male with the third joint dilated, deeply bilobed. In most species the thorax is densely and finely punctate, and when the scales are in place it often has a finely granulated appearance.

KEY TO SPECIES OF GROUP III.

a. Upper margin of antennal grooves directed toward upper part of eyes (Fig. 62, *e.*); scape reaching upper front margin of eye.

b. Thorax coarsely punctate; hind tibiæ of male with a brush of long flying hairs along the inner margin (Fig. 62, *h.*); length 3.5—4.5 mm.

c. Thorax wider than long, densely and coarsely punctate; larger, 3.5—4.2 mm. 225. DELUMBIS.

cc. Thorax not wider than long, sides less rounded; punctures larger, cribrate; smaller, 3.2—3.5 mm. 226. SUBCRIBRATUS.

bb. Thorax finely and densely punctate; hind tibiæ of male without a brush of long flying hairs.

d. Alternate elytral intervals with a row of setæ; each elytron subacuminate at apex. 227. SPARSUS.

dd. Each elytral interval with a row of setæ; elytra conjointly rounded at apex.

e. Thorax suborbicular, strongly rounded at base and sides, its hind angles obsolete. (Fig. 62, *i.*) 228. ROTUNDICOLLIS.

ee. Thorax feebly rounded at sides, its base subtruncate, hind angles distinct and setæ very conspicuous. 229. OBSCURELLUS.

aa. Upper margin of antennal grooves directed toward the middle of eyes (Fig. 62, *g.*); scape of antennæ shorter, reaching front margin of eye about its middle.

f. Surface densely scaly; each interval with a row of distinct setæ; larger, 3.7—4.5 mm.

g. Beak feebly carinate, the lateral carinæ obsolete; thorax distinctly constricted near apex. 230. ECHINATUS.

gg. Beak subcostate or strongly tricarinate; thorax not constricted near apex. 231. NOVELLUS.

ff. Surface very sparsely scaly; third and fifth intervals convex, alternate ones only with setæ; smaller, 2.5—2.8 mm. 232. MINIMUS.

225 (8461). HYPERODES DELUMBIS Gyll., Schön., 1834, 283.

Elongate-oblong. Piceous or dark reddish-brown, above rather sparsely clothed with large whitish rounded scales which are massed to form a pale stripe each side of and rarely a median line on thorax and a humeral spot on elytra; antennæ and legs reddish-brown. Beak feebly tricarinate, rugose-punctate, sparsely clothed with yellowish hair-like scales and four rows of short, suberect setæ. Thorax subquadrate, less than one-half wider than long, sides feebly rounded; disc densely, coarsely, confluently punctate, each puncture bearing a short prostrate hair. Elytra one-half wider than thorax, parallel for two-thirds their length, then gradually narrowed to the conjointly rounded apex; striæ fine, punctures small, rather distant; intervals feebly convex, the alternate ones only bearing a row of rather long, slender setæ. Under surface glabrous, densely and coarsely punctate. Last ventral of male shallowly, transversely impressed; of female with a large oval, rather deep impression. Length 3.5—4.5 mm.

Lake, Vigo and Putnam counties, Ind., scarce; Jan. 21—June 2. Hibernates beneath mullen leaves and rubbish. Dorchester, Mass., Aug. 10. Sanford, Fla., Jan. 12. Ranges from Quebec and New England to Montana and Nevada, south to Florida. Variable in color from grayish-white to piceous, the elytra usually with a large central area somewhat darker than the remainder, and in fresh specimens a number of small patches of white scales, which are more or less connected to form sinuous lines, are visible. The beak is very little shorter than thorax, more slender and less carinate than in the other species of the group, thus bringing it close to the species of group II, with which it is liable to be confused.

226 (10,831). HYPERODES SUBCRIBRATUS Dietz, 1889, 42.

Differs mainly by characters given in key. Form more slender. Punctures of elytral striæ larger, as wide or even wider than the intervals. Last ventral of male with a large subquadrate impression. Length 3.2—3.5 mm.

Dunedin, Florida, Nov. 9. In one specimen in the LeConte collection the scales of elytra are all white instead of dirty gray as in the others seen. Known only from Florida.

227 (8463). HYPERODES SPARSUS Say, 1831, 11; ibid, I, 271.

Elongate-oblong. Piceous or dark reddish-brown, above and under sides of thorax usually rather thickly clothed with dirty gray or brownish scales, which are larger on the elytra; when denuded the elytra with a common broad piceous or darker stripe extending from base two-thirds to apex; the gray scales sometimes massed to form pale stripes on sides of thorax; antennæ and legs reddish-brown. Beak short, stout, tricarinate, the me-

dian carina more distinct; finely rugose-striate, both it and head sparsely covered with yellowish scale-like hairs. Thorax subcylindrical, slightly wider than long, sides feebly rounded, ocular lobes small; disc with punctures concealed by small convex scales, giving it a granular appearance, a more or less ill defined impression along the median line. Elytra at base one-fourth wider than thorax, humeri rounded, prominent, base slightly emarginate, sides subparallel for three-fifths their length, then gradually narrowed and compressed to apex; striæ fine, punctures rather large; intervals slightly convex, the alternate ones more elevated and bearing a row of rather long, slender setæ; the others more or less setose on declivity. Abdomen glabrous, densely punctate. Last ventral of female with a large transverse fovea. Length 4—5 mm.

Frequent throughout Indiana, much more so in the southern portion; March 17—June 2. Evidently hibernates as taken by sifting and beneath bark in early spring; later by sweeping roadside herbage. Ranges from New England and Canada to Missouri. We have included with *sparsus* a number of southern Indiana specimens identified by Liebeck some years ago as *longulus* Dietz. They differ only in being smaller, more narrow and parallel, in having the elytra partially or wholly denuded of scales and in the thorax being slightly more rounded and devoid of median impression. *Listroderes lineatulus* Say (1831, 11) is said by Dietz to be only a form "densely covered with grayish scales, completely concealing the punctures and with the thoracic furrows more distinct."

228 (10,833). Hyperodes rotundicollis Dietz, 1889, 44.

Oblong. Black, densely clothed with fuscous and grayish-white scales, the latter forming a narrow median line and a broad stripe each side on thorax, covering the scutellum and humeri and forming a few irregular spots on the disc of elytra; antennæ, tibiæ and tarsi dark reddish-brown. Beak as in *sparsus*, its lateral carinæ more distinct than there. Thorax as in key, finely and densely granulate-punctate. Elytra one-third wider than thorax, strongly emarginate at base; sides very feebly converging for three-fourths their length, then rapidly rounded to apex; striæ broad, feebly compressed, their punctures large, subquadrate, close-set; intervals slightly convex, alternate ones more elevated near base, each with a row of slender setæ. Under surface coarsely punctate; front tarsi less dilated than in others of the group. Last ventral of female deeply and sharply foveate, emarginate. Length 3.5—4 mm. (Fig. 62, *i*.)

Lawrence County, Indiana, rare; July 29. Taken by sweeping. Irvington, New Jersey, June 19. Ranges from New York to Nebraska and Colorado, south to Texas.

229 (10,834). Hyperodes obscurellus Dietz, 1889, 45.

Close to *rotundicollis* which it resembles in form and color. "Differs in the form of thorax, which has the base subtruncate, hind angles rather

distinct; sides almost straight, slightly divergent from base to middle, the latter subangulate. Elytra feebly emarginate at base. Last ventral of female with a broad transverse excavation, not emarginate. Length 4 mm." (*Dietz.*)

Described from District of Columbia and Texas. Recorded from Brooklyn, N. Y., in Smith's New Jersey List. The setæ of thorax in the only specimen at hand are much more numerous and prominent than in either *rotundicollis* or *sparsus*. Fall considers *obscurellus* a synonym of *sparsus*, but the alternate intervals are not elevated as in that species and all the intervals are distinctly setose throughout their length.

230 (10,838). HYPERODES ECHINATUS Dietz, 1889, 46.

Broadly oblong. Piceous or reddish-brown; above and thorax beneath densely clothed with grayish-white and brownish-yellow scales which are especially large upon the elytra; the pale ones forming a narrow median line and lateral stripes enclosing a dark spot on thorax, and scattered spots on elytra; antennæ and legs reddish-brown. Beak stout, broad, its median carina feeble, the others obsolete. Thorax slightly wider than long, base and apex of almost equal width; sides feebly rounded, ocular lobes rather prominent; disc densely scaly, impressed and feebly constricted near apex, finely and densely granulate-punctate and with scattered short erect setæ. Elytra one-half wider than thorax, slightly narrowed from humeri for three-fifths their length, thence gradually narrowed to tips; intervals convex, each with a row of pale, erect, rather stout, prominent setæ. First and second ventrals coarsely, not densely, last three more finely, punctate. Last ventral of female emarginate at tip and with a large quadrilateral concavity. Length 4.4—4.5 mm.

Dubois and Spencer counties, Indiana, rare; May 12—24. Taken by sweeping. Evanston, Ill., Oct. 14. Orange County, N. Y., April 2. Ranges from Massachusetts and Michigan to Colorado, south to Mississippi, Texas and Arizona. Breeds in the roots of *Senecio* and *Plantago*. (*Pierce*, 1916.)

231 (——). HYPERODES NOVELLUS sp. nov.

Elongate-oblong. Piceous, above thickly clothed with dark brown and ash-gray scales, those of elytra not as large as in *echinatus;* the pale ones forming a narrow median line and lateral stripes on thorax and covering the humeri and the greater portion of the sides of elytra. Beak stout, shorter than thorax, very strongly tricarinate, the median carina arched, the sulci deep, each with a row of short setæ. Thorax subquadrate, scarcely as wide as long, sides almost straight, feebly rounded near base and apex, disc finely and densely granulate-punctate and with numerous erect setæ. Elytra at base nearly one-half wider than thorax, sides parallel to apical fifth, then strongly converging to apex; striæ deep, their punctures fine, close-set; intervals all evenly and strongly convex, each

with a row of long, blackish, erect setæ. Under surface with coarse, rather dense punctures, each bearing a short yellowish hair. Last ventral broadly and feebly impressed in female. Length 3.8—4.5 mm. (*W. S. B.*)

Dunedin and Sarasota, Florida, Jan. 21—Dec. 23. Seven specimens taken from beneath cover along borders of ponds. The elytra are longer and have more numerous and more prominent setæ than in *echinatus*. The much stronger carinæ of beak and more distinctly convex intervals also readily distinguish it from that species. From *hirtellus* Dietz it is separated by its narrower thorax, erect setæ, and more strongly carinate beak. The scales of thorax are so placed as to form short, oblique rugæ.

232 (——): HYPERODES MINIMUS sp. nov.

Oblong, subdepressed. Head, thorax and under surface piceous; elytra dark reddish-brown, usually with a piceous blotch near center; antennæ and legs paler; scales dirty gray, very sparse, forming only a narrow stripe each side of thorax and a few small scattered spots on elytra. Beak short, broad, scarcely two-thirds as long as thorax, narrowed at middle, tri-carinate, the median carina more evident; occiput broad, convex, rather thickly and finely punctate and without the hair-like scales of other species. Antennæ short, scape reaching middle of front of eye; club large, oval. Thorax subcylindrical, one-third wider than long, sides broadly rounded, slightly incurved near base and apex; ocular lobe covering half the eye in repose; disc feebly constricted behind the apex, rather finely and densely punctate, not carinate and without impressions. Elytra broad, distinctly depressed, two-thirds wider at base than thorax, base truncate, sides converging for three-fourths their length, then rapidly narrowing to a conjointly rounded apex; strial punctures large, close-set, wider than the intervals; the latter narrow, convex, the third and fifth rather strongly elevated, the alternate ones with a row of short, yellow inclined setæ on the disc, the others with a few scattered setæ on the declivity. Under surface glabrous, the sterna coarsely and densely punctate, first four ventrals much more sparsely punctate; last ventral finely and densely punctate, paler than the others, broadly rounded in female, subtruncate and with a faint median apical impression in male. Length 2.3—2.7 mm. (*W. S. B.*)

Dunedin, Fla., Jan. 21—Dec. 23. Frequent beneath cover along the margins of inland ponds. Mating on several dates in February and March. Readily known by its small size, broad depressed elytra and almost total absence of scales. The LeConte collection contains two specimens (No. 1903) without name or locality labels.

GROUP IV.

Rather short, subdepressed species having the upper surface more or less clothed with fine, prostrate, hair-like pubescence and usually also scales along the sides of thorax and elytra; antennal

grooves widened toward base of beak, the scape directed toward middle of eye, club more broadly oval than usual; alternate intervals only seta-bearing except upon the declivity; thorax with a smooth median line or carina, front tibiæ shorter and stouter, the third joint distinctly dilated in the male.

KEY TO SPECIES OF GROUP IV.

a. Humeri very prominent, rounded and subangulated behind; pubescence coarser; thorax scarcely wider than long. 233. MIRABILIS.

aa. Humeri less prominent, rounded, not subangulated behind; pubescence finer.

b. Antennal grooves ill-defined and widened behind; thorax one-third to one-half wider than long. 234. HUMILIS.

c. Densely pubescent; surface subopaque; length 4—4.5 mm. 235. ANTHRACINUS.

cc. Pubescence very sparse; surface shining; length 3.5—4 mm.

bb. Antennal grooves sharply defined, only moderately widened behind; thorax subcylindrical, scarcely wider than long; smaller, 2.7—3 mm. 236. PORCELLUS.

233 (10,841). HYPERODES MIRABILIS Dietz, 1889, 49.

Oblong, rather stout. Piceous, variegated above, especially on sides and declivity of elytra, with white and pale brown scales; scutellum and humeri covered with cream-colored scales; antennæ and legs reddish-brown; pubescence yellowish with a brassy lustre. Beak stout, about as long as thorax, wider at base than apex, carinæ feeble. Thorax at base as long as wide, base distinctly wider than apex, sides broadly rounded; disc feebly constricted behind apex, densely punctate, the median carina very fine. Elytra at base more than one-half wider than thorax, sides parallel for three-fourths their length; strial punctures large, close-set; intervals wide, flat, the alternate ones with a row of rather distant, clavate setæ. Length 4.5 mm.

Described by Dietz from a single Illinois specimen, now in the Ulke collection at Pittsburg.

234 (8466). HYPERODES HUMILIS Gyll., Schön., 1834, 284.

Oblong. Piceous-black, subopaque; thorax with a stripe each side, extending onto the humeri, and a small spot in front of scutellum covered with large pale scales; sides of elytra sparsely covered with similar scales; antennæ, tibiæ, tarsi and apex of thorax, dark reddish-brown; pubescence fine, reddish or grayish-white. Beak almost as long as thorax, tricarinate, densely punctate, the median carina stronger. Thorax one-third wider than long, sides feebly rounded, disc densely and finely rugose-punctate and with a faint narrow abbreviated median carina. Elytra one-half wider at base than thorax, sides as in *mirabilis:* disc feebly and broadly impressed at basal third, strial punctures large; intervals flat, the alternate ones with a row of short, pale, suberect setæ. Last ventral of female with a large, subquadrate, shallow fovea. Length 4—4.5 mm.

Lake, Kosciusko and Dubois counties, Indiana, scarce; May 11—June 25; taken by sifting and sweeping. Batavia, N. Y., May 30—June 3. Ranges from Newfoundland and Quebec to Montana, south to Kansas and Mississippi.

Hyperodes maculicollis Kirby, listed from several localities in our territory, is stated by Dietz to be a form of *humilis* having "the lateral thoracic vittæ obsolete in their anterior halves thereby giving the appearance of three basal spots." *H. vittiicollis* Kirby, larger (5 mm.) pubescence darker and coarser, thorax wider with sides more rounded, and with median and lateral pale stripes, and elytra with scattered spots of large white scales, is also listed, probably erroneously, as Dietz gives its occurrence as Wyoming and Nebraska.

235 (10,843). HYPERODES ANTHRACINUS Dietz, 1889, 51.

Oblong. Black, front margin of thorax, antennæ and tarsi reddish-brown; elytra with a few irregular scattered spots of pale scales. Beak about as long as thorax, stout, tricarinate, coarsely rugose-punctate, the transverse basal impression deep and with a very distinct central fovea. Thorax one-half wider than long, convex, sides feebly curved, apex and base subequal; disc densely and very coarsely punctate, broadly constricted near apex, median carina distinct, abbreviated at each end. Elytra one-half wider than thorax at base, sides subparallel for two-thirds their length, then rounded into the tips; strial punctures large, transverse, close-set; intervals narrow, feebly convex, the third and fifth slightly more elevated, setæ very short. Under surface coarsely and rather sparsely punctate; last ventral finely punctate and broadly impressed in both sexes. Length 3.5—4 mm.

Dunedin, Passenger and Sarasota, Florida; Jan. 19—Dec. 23. Quite common at Dunedin beneath boards along the margin of ponds, mating March 24—31. Known only from Florida. The black, shining surface, coarse elytral punctures and distinct thoracic carina make it easily recognized.

236 (8467). HYPERODES PORCELLUS Say, 1831, 11; ibid. I, 271.

Oblong. Piceous black, shining; above rather sparsely clothed with fine, prostrate, grayish-white hairs; sides of thorax with a stripe of dirty white scales; elytra variegated with small spots of similar scales; antennæ, tibiæ and tarsi reddish-brown; femora in part piceous. Beak slightly shorter than thorax, tricarinate, densely rugose-punctate. Thorax subquadrate, scarcely wider than long, sides almost straight; disc densely and finely punctured, the median carina short, scarcely evident. Elytra one-half wider than thorax at base; strial punctures large, transverse, close-set; intervals feebly convex, scarcely wider than punctures. Under surface densely and coarsely punctured, each puncture bearing a short, scale-like hair, these especially evident on pro- and metasterna. Length 2.7—3 mm.

Lake, Marion and Vigo counties, Ind., scarce; Jan. 30—July 17. Hibernates beneath logs and rubbish in damp places. Docia, Miss., May 23. Ranges from Canada and New England to Iowa and Texas. Fletcher mentions it (1891) as feeding upon oats in Canada, and also upon the barnyard grass, *Panicum crusgalli* L., while Pierce records it as being collected on rice at Markham, Texas.

Tribe IV. PISSODINI.

The genus *Pissodes*, formerly included in the tribe Hylobiini, is treated in the Biologia and in recent European literature as composing a separate tribe, differing from Hylobiini by its slender beak, with the antennæ inserted at or near its middle. In addition it differs by having the front coxæ slightly separated, thorax with front ventral margin not emarginate or produced toward the sides, first joint of antennal club smooth and subglabrous. The cells in which pupation takes place are sometimes lined with a thick coating of masticated, excelsior-like wood fibre, forming the so-called "chip-cocoons."

I. Pissodes Germ., 1817. (Gr., "pitch-colored.")

Reddish-brown to black species varying in length from 4 to 10 mm. and having, in addition to characters given for the tribe, the body sparsely to thickly clothed with slender to broad scales, the latter often forming spots on thorax, elytra and femora; head behind the eyes globular, about one-half as wide as thorax, glabrous, punctured, feebly impressed between the eyes; eyes rounded, widely separated; beak slender, cylindrical, as long or longer than thorax; antennæ inserted at or near its middle, their grooves beginning just in front of the insertion and extending almost parallel with lower margin of beak to near the eyes; scape shorter than funicle; first joint of latter subequal to second and third together, 3—7 subequal in length, slightly increasing in width; first joint of club large, longer on one side, sparsely clothed with short hairs and long bristles, remainder of club densely and finely pubescent; thorax rarely longer than broad, narrowed in front of middle, the discal punctures with intervening flat or elevated spaces; elytra with base as wide or slightly wider than thorax, sides parallel or slightly narrowed to the declivity, the latter oblique, feebly constricted; striæ punctured, fifth interval elevated at apex; femora not toothed; front tibiæ with tooth on inner apical angle.

The sexes differ as follows: In the males there are eight instead of seven visible abdominal tergites, the seventh being known by its broadly retuse hind margin, while the eighth, or pygidium, is prominent with the tip broadly rounded. In this sex the inner apical tooth of the tibiæ is usually more prominent. The beak of the female is longer, smoother and more slender than that of male. The genus has been recently excellently treated by

Hopkins, A. D. —"Contributions Toward a Monograph of the Bark-Weevils of the Genus Pissodes," *in* Bull. 20, Pt. I, Tech. Ser. U. S. Bur. Entom., 1911.

In this bulletin Hopkins recognized 30 species as belonging to the fauna of the United States, 12 of which occur east of the Mississippi River. We have followed his key in separating them as follows:

KEY TO EASTERN SPECIES OF PISSODES.

a. Elytral intervals 3 and 5 broader or more elevated than 2 and 4; hind tibiæ of male without long fringe of hairs.

b. Elytra always with anterior and posterior spots of densely placed pale scales.

c. Beak moderately stout, shorter than thorax, the latter with hind angles obtuse; posterior spot of elytra very large and with distinct dark border; length 3.7—4 mm. 237. SIMILIS.

cc. Beak slender, shorter or longer than thorax, the latter with hind angles rectangular.

d. Elytra with sides parallel, the anterior and posterior spots large; beak never longer than thorax, the latter densely punctured; length 4.5—6 mm. 238. STROBI.

dd. Elytra with sides usually distinctly narrowed behind and with small to moderately large anterior pale spot and posterior brown and white spots, the latter usually separated; beak longer than thorax.

e. Posterior brown spots moderately large; length 4.3—6.7 mm. 239. APPROXIMATUS.

ee. Posterior brown spots small.

f. Elytra noticeably narrowing from the base to apical third; length 5—7.7 mm. 240. NEMORENSIS.

ff. Elytra not noticeably narrowing behind the base; length 4.2—5.8 mm. 241. DEODARÆ.

bb. Elytra usually without distinct anterior spots and with the posterior ones in front of the vertex of declivity.

g. Punctures of thorax distinctly separated, those of elytral striæ small to coarse.

h. Thorax not narrower than elytra.

i. Thorax short, stout, deeply constricted in front, its sides strongly rounded; length 4.2—5.2 mm. 242. FISKEI.

ii. Thorax subelongate, not deeply constricted in front; length 4.2—6 mm.

j. Dark brown; thorax moderately stout; intervals 3 and 5 of elytra scarcely elevated. 243. NIGRÆ.

jj. Pale brown; thorax elongate; intervals 3 and 5 moderately elevated. 244. PUNCTICOLLIS.

hh. Thorax distinctly narrower than elytra; color black; length 6—7.3 mm. 245. ROTUNDATUS.

gg. Punctures of thorax irregular, not distinctly separated; those of elytral striæ very coarse and irregular; thorax distinctly narrower than elytra.

k. Thorax convex, without dorsal impressions and elevations; length 4.8—5.7 mm. 246. DUBIUS.

kk. Thorax moderately convex and usually with dorsal impressions and elevations; length 4.6—9 mm. 247. FRASERI.

aa. Elytral intervals 3 and 5 not broader or more elevated than 2 and 4; hind tibiæ of male with long fringe of hairs; elytra with distinct posterior spots; length 5.5—8 mm. 248. AFFINIS.

237(——). PISSODES SIMILIS Hopk., 1911, 32, 44.

Oblong, smaller than *strobi*. Light to dark brown; front spots of elytra distinct, hind ones very large, extending to the middle of each elytron. Beak as in key. Thorax narrower than elytra, its hind angles subobtuse, punctures of disc moderately coarse. Elytra with third and fifth intervals strongly elevated and rugose. Length 3.7—4 mm.

Maine, New Hampshire and high mountains of North Carolina on the balsam firs, *Abies balsamea* L. and *A. fraseri* Pursh. The type was collected by Wm. Beutenmüller in the spruce forest on Black Mountain, N. Car.

238 (8472). PISSODES STROBI Peck, Mass. Agr. Journ., IV, 1817, 205.

Oblong-oval. Dark to light brown, the hind spots of elytra forming an almost continuous band across apical third, this yellowish on sides, paler toward suture; thorax with several small round spots. Beak shorter than thorax in male; equal to it in female, finely and densely punctate. Thorax as broad at base as long, sides parallel on basal half, narrowed in front of middle, disc densely and finely rugose-punctate. Elytra wider than thorax, sides parallel to beyond the hind spot, then converging and compressed to apex; striæ distinctly punctured; third and fifth intervals moderately elevated. Length 4.5—6 mm. (Fig. 63.)

Fig. 63. (After Hopkins.)

Not known from Indiana but probably occurs rarely in the State, as the white pine is found in a few counties. Ranges from New England, where it is common, to Pennsylvania and Mississippi and

northwest to Michigan, Minnesota and over the eastern half of Canada. Known as the "white pine weevil," the eggs being laid in the bark of terminal shoots, especially those of saplings, the larvæ burrowing under the bark, completely separating it and causing the death of the terminal. Infests also the pitch and Labrador pines, *Pinus rigida* Mill and *P. divaricata* Ait., and the red and Norway spruces, *Picea rubens* and *P. excelsa* L. Very injurious to the white pine, much less so to the other species.

239 (——). PISSODES APPROXIMATUS Hopk., 1911, 33, 49.

Oblong-oval. Dark brown to nearly black, the hind spots of elytra separated, the yellow one smaller, the white one extending over the second interval. Beak longer and more slender than in *strobi*. Thorax not distinctly narrower than elytra, its punctures rather coarse. Third interval of elytra broad, flattened, moderately rugose. Length 4.3—6.7 mm.

One specimen in the Stein collection, labelled Indiana. Range very nearly the same as that of *strobi*. Attacks the same pines, as does the latter, and also the yellow, red, scrub and table mountain pines, *Pinus echinata* Mill. *P. resinosa*, Ait., *P. virginiana* Mill. and *P. pungens* Michx.; occurring not in the terminal shoots but in the thick bark on the trunks, stumps and logs and the base of saplings. Commonly confused in collections and literature with *strobi*, but distinguished by its average larger size, the sides of elytra more narrowed behind and their spots always smaller.

240 (——). PISSODES NEMORENSIS Germ., 1824, 318.

Oblong. Pale brown to nearly black, the hind spots of elytra much as in *strobi* but slightly smaller, the white ones extending to the first interval. Beak slender, distinctly longer than thorax in both sexes. Elytra as wide at base as thorax, the third and fifth intervals rather narrow and strongly elevated. Length 4.9—7.7 mm.

Dunedin, Fla., Feb. 26. Clayton, Ga., June. A southern species, ranging from Maryland, Kentucky and southern Missouri, south to Florida and west to eastern Texas. Occurs on the yellow, scrub, long-leaved and loblolly pines, attacking the thick bark on trunks of dying and felled trees, stumps, base of saplings, etc., but apparently not especially injurious. This species was long confused with *P. strobi*, but has much longer and more slender beak, and a different range and habits. From *approximatus* it may be known by its longer beak and by the sides of elytra more distinctly converging behind the base. Treated as a synonym of *strobi* in the Biologia.

241 (——). Pissodes deodaræ Hopk., 1911, 34, 52.

Elongate-oblong, slender. Pale grayish-brown, the hind brown spot of elytra very small. Beak longer than thorax in both sexes. Thorax slightly narrower than elytra, the latter with sides nearly parallel, intervals 3 and 5 but slightly elevated. Length 4.2—5.8 mm.

Known only from Georgia, where it attacks the living branches, tops and terminals of *Cedrus deodara*, the introduced deodar cedar. From *P. nemorensis* it is known by its average smaller size, longer beak, less elevated elytral intervals and more parallel sides of elytra, as well as by its habit and host plant.

242 (——). Pissodes fiskei Hopk., 1911, 35, 59.

Oblong. Dark brown, elytra without front brown spot but with a broad posterior one. Thorax with discal punctures well separated and hind angles rounded. Elytra at base as wide as thorax, intervals 3 and 5 strongly elevated, convex, rugose; strial punctures small. Length 4.2—5.2 mm.

Recorded only from New Hampshire, where it occurs in the thick bark on the logs, stumps and trees of the spruces, *Picea rubens* and *P. mariana* Mill.

243 (——) Pissodes nigræ Hopk., 1911, 35, 59.

Oblong. Dark brown, elytra with small or obscure front spots and distinct yellowish to white posterior ones situated towards the middle. Beak longer than thorax, the latter short, broad, with rounded sides, its hind angles rounded. Elytra as wide as thorax, intervals 3 and 5 flattened, their rugosities fine; strial punctures coarse. Length 4.4—5.6 mm.

Occurs in northern New England, New York and Pennsylvania on the black spruce, *Picea mariana* Mill, the larvæ attacking the dying bark on the trunks of small trees.

244 (——). Pissodes puncticollis Hopk., 1911, 35, 60.

Elongate-oblong. Pale reddish-brown; elytra with small front spots on fourth intervals and large posterior ones just behind the middle. Thorax longer than wide, its punctures irregular. Elytral intervals with fine rugosities, 3 and 5 slightly elevated and flattened; strial punctures rather coarse. Length 4.2—6.1 mm.

Known only from West Virginia, where it occurs on the red spruce, *Picea rubens*, in the dying bark on felled and standing trees.

245 (8477). Pissodes rotundatus Lec., 1876, 143.

Elongate-oblong. Black; elytra with small white spots behind the middle, rarely with smaller front ones. Thorax with sides and hind angles rounded; punctures dense, regular. Elytra with third interval very broad, both it and fifth elevated; strial punctures irregular. Length 6—7.3 mm.

Occurs about Lake Superior, in Michigan, Wisconsin, Massachusetts and Canada. Its food plant not definitely known but probably the spruces, *Picea canadensis* Mill and *P. rubens*.

246 (8476). PISSODES DUBIUS Rand., 1838, 24.

Oblong. Black; elytral spots small and obscured by numerous scattered white or yellow scales. Beak about as long as thorax; the latter narrower than elytra, its disc convex, its punctures irregular, not distinctly separated, hind angles obtuse. Length 4.8—5.7 mm.

Ranges from Ontario and Maine to Michigan on the balsam fir, *Abies balsamea* L., the larvæ occurring in thick living and dying bark of stumps and trees.

247 (——). PISSODES FRASERI Hopk., 1911, 36, 63.

Closely allied to *P. dubius*, from which it is distinguished by its large size, very long beak and moderately convex thorax, with basal and oblique subdorsal impressions. Length 4.6—9.1 mm. (Fig. 1.)

Occurs in the mountains of North Carolina on Fraser's balsam fir, *Abies fraseri* Pursh., the larvæ in the thick living and dying bark of living and partly dead trees.

248 (8475). PISSODES AFFINIS Rand., 1838, 24.

Elongate-oblong, robust. Dark reddish-brown to black, thorax with small scattered patches of yellowish scales; elytra with or without faint front spots, but with distinct transverse spots of white or yellow scales on apical third. Beak as long as thorax, slender. Thorax as wide at base as long, sides parallel from base to middle, thence strongly rounded to the much narrower apex, hind angles rectangular; disc rather coarsely and very densely punctate, with a narrow smooth median line. Elytra one-fifth wider at base than thorax, its intervals all of equal convexity and elevation; strial punctures rather coarse. Length 5.5—8 mm.

Monmouth, Maine, June 20; Ithaca, N. Y., May 20. Ranges from Newfoundland and New England to Wisconsin and Minnesota. Occurs on the white pine, *Pinus strobus* L., in the thick bark on the stumps.

Tribe V. HYLOBIINI.

Rather large, dark colored species having the eyes transverse, not contiguous beneath; mandibles with two apical teeth, the lower one a little shorter, and in addition a cusp on the inner edge, so that they are in reality three-toothed; mentum transverse, labial palpi large; beak stout, the antennæ inserted in front of middle; funicle 7-jointed, club oval, pointed, ringed and wholly pubescent and sensitive; prosternum broadly emarginate and

produced towards the sides; ventral segments of abdomen unequal, the first, second and fifth longer; front coxæ contiguous; legs stout, the tibiæ compressed, armed with a strong tooth at tip, the articular surface on the side; terminal edge of hind tibiæ double, the corbel or space which they enclose, narrow except in *Pachylobius*, where it is very large and wide; third joint of tarsi dilated, spongy beneath; claws simple, diverging.

The members of the tribe are known as "bark weevils" and they and their larvæ do much damage to pine, fir, spruce and other coniferous trees. The eggs are deposited by the female in cavities excavated by the beak in the inner bark of the host tree. The larvæ, which are elongate, cylindrical, yellowish-white footless grubs, infest both living and partly dead trees, deriving their food from the inner bark, eating as they move slowly forward. In this way they form long winding galleries in the inner bark, and oftentimes grooves in the outer wood, these galleries or grooves ending in cells in which pupation takes place. The adults of some species emerge from the bark and hibernate in the ground, while others pass the winter in the bark.

KEY TO GENERA OF HYLOBIINI.

a. Mesosternum very short, depressed, only the process lying in the same plane as the metasternum; thorax longer than wide, not narrower than elytra; femora toothed. I. PARAPLINTHUS.

aa Mesosternum moderately long; thorax usually wider than long.

b. Tibiæ short and thick, their outer apical angle dilated. II. PACHYLOBIUS.

bb. Tibiæ of usual form, their outer apical angle not dilated.

c. Femora club-shaped, strongly toothed.

d. Body with spots of fine pubescence; tibiæ not narrowed toward the tips. III. HYLOBIUS.

dd. Body with spots composed of small scales; tibiæ narrowed toward the tips. IV. HEILIPUS.

cc. Femora feebly club-shaped, not toothed.

e. Elytra oval, convex; eyes small. V. HYPOMOLYX.

ee. Elytra elongate, parallel; eyes large. VI. EUDOCIMUS.

I. PARAPLINTHUS Faust, 1892. (Gr., "near" + Plinthus.)

Beak as long as thorax, rather slender, distinctly curved; antennæ inserted at apical fourth; first and second joints of funicle subequal, each one-half longer than those which follow; prosternum slightly emarginate in front; first and second ventral segments each as long as third and fourth united, their suture deep on the sides, obsolete at middle, their centers broadly excavate in male; femora feebly clavate; tibiæ rather long, curved near apex. Our single species does not agree with the generic characters of

Paraplinthus as set forth by Reitter (1897, 67) in that the first and second ventrals are not separated throughout but are united at middle. However we follow Fisk in placing it under that genus until a careful study of all allied forms can be made.

249 (——). Paraplinthus shermani Fisk, Proc. Wash. Ent. Soc., VIII, 1906, 31.

Elongate, slender, subcylindrical. Dark reddish-brown; above sparsely clothed with elongate, yellowish scales, forming obscure irregular markings on the elytra. Beak feebly tricarinate, foveate between the antennæ, coarsely punctate; front with a small, deep fovea. Thorax one-fourth longer than wide, widest at middle, sides broadly rounded; disc with a narrow median carina and numerous coarse shining tubercles. Elytra not wider at base than middle of thorax, humeri small, rounded; striæ indistinct, marked by coarse punctures, these separated by slightly elevated tubercles; intervals each with an irregular row of tubercles, more strongly developed on the alternate ones, which are also distinctly elevated. Length 6.5—6.8 mm.

Pisgah Ridge, Transylvania Co., N. C., at an elevation of between 5,000 and 6,000 feet. Highlands and Grandfather Mountain, N. C., June. Occurs on the under side of freshly cut spruce chips lying on the ground.

II. Pachylobius Lec., 1876. (Gr., "thick" + "lobe.")

Beak as long as thorax, rather stout, not curved, feebly impressed between the eyes, slightly widened at tip; antennal grooves reaching the front margin of middle of eyes; antennæ stout, scape not quite reaching the eyes, first and second joints of funicle each one-half longer than 3—7, which are short and gradually broader; mandibles flattened, the lower tooth of the other genera the front one here; prosternum broadly emarginate in front and fringed with long yellow hairs; femora clavate, beneath deeply sinuate and strongly toothed; tibiæ short, suddenly widened, strongly sinuate above the middle, expanded at tip so that the corbels are very wide.

250 (8478). Pachylobius picivorus Germ., 1824, 311.

Elongate-oblong, robust, Dark brown, very sparsely clothed with short, prostrate white, yellowish or reddish-brown hairs which form small distant patches on the alternate intervals of elytra. Thorax one-fourth wider than long, sides parallel on basal half, feebly convergent in front of middle, slightly constricted behind apex; disc densely marked with short concentric ridges, between which are coarse punctures bearing minute prostrate hairs; a narrow median line smooth. Elytra slightly wider than thorax, base truncate, sides subparallel to apical third, thence converging to the rounded apex; striæ shallow, their punctures oblong; intervals flat, densely rugose-granulate. Length 9—11 mm.

Lake and Vigo counties, Ind., rare; May 20—September 19. Not rare in the pine barrens of New Jersey, May to October; Yaphank, Long Island, Ormond, Sanford, Sarasota and Dunedin, Fla., Jan. 14—April 4; one on flower of thistle Feb. 14. Ranges from Labrador, Ontario and New England to Arkansas and Florida. Known as the "pitch-eating weevil," the larvæ boring into the inner bark of stumps and roots of recently felled dying and injured pine. Often found at light. *Hylobius stupidus* Boh. is a synonym.

III. Hylobius Germ., 1817. (Gr., "wood" + "to live in.")

Beak stout, cylindrical, feebly curved; antennal grooves directed toward the lower part of eyes; mandibles normal in form; antennæ stout, scape barely reaching the eye, joints 1 and 2 of funicle distinctly longer than the others, the first longer than the second, 3–6 moniliform, seventh much broader, forming part of club; eyes large, coarsely granulated, transverse, separated by their own diameters; prosternum as in *Pachylobius;* tibiæ rather slender, sinuate on the inner side, corbels narrow, terminal hook strong; second and fifth ventral segments each as long as the third and fourth united, suture in front of second broadly angulated at middle.

251 (8479). Hylobius pales Hbst., 1797, 31.

Oblong, robust. Dark reddish-brown; elytra with scattered small tufts of rather long gray or yellowish hairs, those behind the middle arranged to form two oblique cross-bars. Head sub-opaque, densely though not coarsely punctured. Thorax much as in *Pachylobius*, somewhat shorter and more depressed, sides slightly more rounded; disc more coarsely punctured and wrinkled. Disc of elytra distinctly flattened, striæ with large, oblong punctures; intervals rather narrow, flat, rugose-punctate. Abdomen sparsely and rather finely punctate. Length 7—10 mm.

Lake and Marion Counties, Ind., rare; July 3—August 16. Ranges from Nova Scotia, Quebec and New England to Lake Superior, south to Florida. Occurs in and beneath the bark of pine, the larvæ destroying the inner bark and the tender, newly formed wood beneath, thus often doing much damage to pine forests. Harris (1862, 70) states that in Massachusetts the adults "may be found in great abundance, in May and June, on board fences, the sides of new wooden buildings, on the trunks of pine trees and under the bark of the pitch pine." It also comes to light.

252 (8480). Hylobius confusus Kirby, 1837, 196.

Fig. 14. × 3. (After Brehm.)

Closely resembles small forms of the preceding. Head more shining, less densely and rather more coarsely punctured. Thorax narrower, less constricted near apex, the punctures less confluent, the surface less plicate. Pubescence very sparse, nearly white. Length 6.8 mm.

Litchfield, Conn., July 5. Found near New York on blackberry blossoms in June. Ranges from Nova Scotia, Quebec and New England to Lake Superior and Alaska in the Transition and Boreal Life Zones.

IV. Heilipus Germ., 1824. (Gr., "bent" + "claw.")

Beak longer than thorax, cylindrical and more curved than in *Hylobius;* antennal grooves ending at a greater distance from the mouth; seventh joint of funicle distinct from the club; tooth of femora much larger and broader; tibiæ compressed, bent inwards, much less sinuate on the inner side; first ventral suture deeper and more strongly angulated at middle. The genus is represented by many species in Tropical America, and by a large and handsome black one in the Southern States.

253 (8481). Heilipus apiatus Oliv., 1807, 171.

Oblong. Black, a broad angulated white stripe on each side of thorax, a very irregular one with numerous small white spots on elytra and a row of similar yellowish spots on each side of abdomen; these spots and stripes formed of small, round white scales, not hairs. Eyes approximate in front. Thorax oblong, narrowed in front; disc subdepressed, rather sparsely and coarsely rugose punctate, and with an abbreviated smooth median line. Elytral striæ with large distant punctures; intervals strongly, transversely rugose. Length 14—16 mm.

Enterprise, Fla., Sept. 27. Tennessee, on budding shoots of sassafras (*Dury*). Georgia and Florida, rare, under pine bark (*LeConte*). Occurs also in French Guiana. *H. squamosus* Lec. is a synonym.

V. Hypomolyx Lec., 1876. (Gr., "toothed" + "beneath.")

Beak as long as thorax, rather stout, slightly curved, coarsely punctured with deep, triangular groove on side in front of eyes and three faint carinæ above; antennal grooves extending to lower edge of eyes; first and second joints of funicle subequal, longer, 3—6 rounded, shorter, seventh broader and larger; thorax without postocular lobes; prosternum as in *Pachylobius;* fifth ventral but little longer than fourth; femora scarcely club-shaped, sinuate near tip, not toothed; tibiæ slender, feebly sinuate, the apical hook strong. One species occurs in the Boreal Life Zone.

254 (8482). Hypomolyx piceus DeG., 1775, 221.

Elongate-ovate, broader behind. Blackish-piceous, somewhat shining; thorax thinly clothed with coarse prostrate hairs; elytra thickly mottled with small tufts of yellowish hair. Thorax rather small, subserrate on the sides; disc carinate in front, very coarsely punctate and with a deep fovea each side the carina. Elytral striæ marked with large, deep, elongate punctures; intervals densely and coarsely granulate-punctate. Length 12.5—13.5 mm.

Mt. Marcy, N. Y., Oct. 1. Ranges from New England, Nova Scotia and Newfoundland to northern Michigan, Siberia and Europe. Occurs in the White Mountains of New Hampshire, June, July, and the Adirondacks of New York. *H. pineti Fab.* and *H. pinicola* Couper are synonyms..

VI. Eudocimus Schön., 1836. (Gr., "marked" + "excellently.")

Beak cylindrical, nearly straight, as long as thorax; antennal grooves reaching middle of front of eyes; first and second joints of funicle elongate, equal, 3—7 shorter, gradually a little wider; second ventral equal to the third and fourth united, its front suture nearly straight; femora unarmed; tibiæ straight, not compressed, the terminal hook strong. The genus contains one large, conspicuous species.

255 (8483). Eudocimus mannerheimii Boh., Schön., 1836, 241.

Elongate-oblong, subdepressed above. Black, rather thickly clothed with small brown scales; sides of thorax striped with pale and elytra with three or four small but conspicuous pale spots on fourth interval, which is also clouded with black. Thorax slightly wider at base than long, sides moderately rounded; disc coarsely rugosé-punctate and with a narrow smooth median line. Elytra a little wider than middle of thorax, rather deeply striate; the punctures each closed by a yellowish scale; intervals flat. Length 10.5—15 mm.

Lake Worth and Crescent City, Florida. Ranges from New York to Georgia and Louisiana. Recorded from various points in New Jersey and near Washington, D. C. Hopkins (1904-b, 34) states that it is known as the "cypress weevil;" the adults feeding on the bark of the twigs of bald cypress, *Taxodium distichum* L., causing their death, while the larvæ mine the inner bark of injured and recently felled trees.

Tribe VI. HORMOPINI.

This tribe comprises a single medium sized species having the eyes very large, transverse and coarsely granulated, widely separated above, but nearly contiguous beneath; beak stout, somewhat flattened, shorter than thorax; antennæ inserted near its tip.

their grooves deep, oblique, suddenly and acutely flexed beneath, where they form a deep, transverse excavation in front of the eyes; scape long, slender, slightly clavate, first joint of funicle equal to the four following, 2—7 short, club small, oval, pubescent, annulated; first and second ventral segments longer than the others, third and fourth short, fifth broadly rounded behind, as long as the two preceding united; legs short, stout, femora thick, not clavate nor toothed; tarsi dilated, spongy beneath, the third joint bilobed; claws small, approximate.

I. HORMOPS Lec., 1876. (Gr., "connected" + "eye.")

256 (8958). HORMOPS ABDUCENS Lec., 1876, 321.

Dark reddish-brown, shining, thinly clothed with long yellow prostrate hairs. Head and beak densely punctured. Thorax wider than long, rounded on the sides, feebly constricted near tip, broadly rounded at base, strongly but not very coarsely or densely punctured, without trace of dorsal smooth line. Elytra wider than thorax, feebly emarginate at base, sides feebly rounded, tips conjointly broadly rounded; disc somewhat flattened, striæ well impressed, slightly punctured; intervals nearly flat, punctate. Beneath strongly and densely, the last ventral more finely, punctate. Length 4 mm.

Plummer's Island, Md., May 13; one specimen beaten from dead branch. The type and only other known specimen was taken by Hubbard and Schwarz at Capron, Florida, in April.

Tribe VII. ERIRHININI.

This tribe embraces a large group of small species having the mandibles 3-toothed, separated by two notches, the middle tooth more prominent; mentum small, not transverse; antennal grooves beginning at a distance from tip of beak and usually curving obliquely downward; scape of antennæ long and slender, funicle either 6- or 7-jointed, club oval, ringed, usually entirely sensitive; metasternum as long as first ventral segment; front coxæ contiguous, hind ones widely separated, narrower on the outer side and reaching almost to the elytral margin; ventral segments unequal, the third and fourth united usually about equal to the second or fifth; legs rather slender, femora not toothed (except in *Dorytomus*), tibiæ truncate and usually mucronate at tip; claws not or broadly toothed. Most of the species occur on plants near water, though the larvæ of some infest the seeds of sunflowers and other wild plants, few of them as yet being especially injurious to the farmer. The tribe is represented in the Eastern United States by 18 genera, which, for convenience of treatment, are separated into four subtribes.

The following are the principal papers treating of the North American species of the tribe:

Casey, T. L.—"Erirhinini," *in* Ann. N. Y. Acad. Sci., VI, 1892, 360—411.

Dietz, W. G.—"Revision of the Genera and Species of Desmori of North America," *in* Trans. Am. Ent. Soc., XXI, 1894, 113.

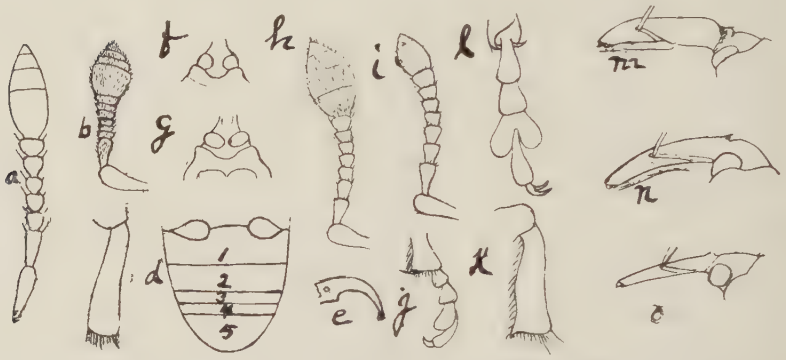


Fig. 65. Structures of Erirhinini. *a*, Antenna of *Notaris puncticollis; b*, antenna of *Eucleptus testaceus; c*, front tibia of same; *d*, abdomen of same; *e*, claw of same; *f*, under side of head of *Desmoris*, showing eyes widely separated beneath; *g*, same of *Smicronyx* showing eyes narrowly separated; *h*, antenna of *Pachyphanes* showing large antennal club; *i*, same of *Smicronyx* showing small club; *j*, hind tibia of *Pachyphanes amœnus; k*, same of *Desmoris scapalis; l*, tarsus of *Pachyphanes lineolatus; m*, beak of *Smicronyx impressirostris; n*, same of *S. corniculatus*, male; *o*, same of *S. griseus*. (After Dietz.)

KEY TO EASTERN SUBTRIBES OF ERIRHININI.

a. Body normally scaly or pubescent, not covered with a waterproof crust.

b. Eyes distant from front margin of thorax, separated from the latter by a space equal to or greater than their own diameters. I. Derelomi, p. 190.

bb. Eyes contiguous to front margin of thorax, often partly covered by the latter in repose.

c. Beak not constricted at base; claws divergent. II. Erirhini, p. 193.

cc. Beak constricted at base (i. e. sharply separated from head by a transverse line) (Fig. 65, *m*., *n*., *o*.); claws connate or approximate. III. Smicronychi, p. 201.

aa. Body covered with a dense, varnish-like, waterproof coating of scales. IV. Hydronomi, p. 221.

Subtribe I. Derelomi.

This subtribe, as here included, is equivalent to the tribe Derelomini of LeConte, and his group Eugnomi of the Erirhinini. It comprises small oblong, almost or wholly glabrous species having the beak long, slender, cylindrical; head more or less prolonged behind the eyes, the latter small, coarsely granulated; antennæ inserted about one-fourth from tip of beak, scape slender, reaching the eyes; funicle 7-jointed; first, second and fifth ventral segments long, third and fourth united not equal to second

(Fig. 65, *d*); femora not toothed; tibiæ unarmed, truncate at tip; tarsi spongy beneath, third joint broad, deeply bilobed; claws with a broad obtuse tooth at base (Fig. 65, *e*.)

KEY TO EASTERN GENERA OF SUBTRIBE DERELOMI.

a. Body wholly glabrous; prosternum very long in front of coxæ; thorax of male with a short oblique tooth on sides near apex. I. DERELOMUS.

aa. Body very finely and sparsely pubescent; prosternum much shorter in front of coxæ; thorax unarmed on sides. II. EUCLYPTUS.

I. DERELOMUS Schön., 1826. (Gr., "fringe" + "neck.")

Beak projected forwards; antennal grooves passing obliquely to the lower edge of eyes; first joint of funicle stouter and as long as the next two, 2—7 gradually slightly broader, club elongate, pointed, pubescent; thorax quadrate, suddenly narrowed to tip which is constricted; elytra scarcely wider than thorax, sides parallel, tips conjointly rounded, covering the pygidium; front coxæ narrowly separated. Our species are listed under the name *Notolomus*, of which LeConte wrote (1876, 222): "agrees entirely with *Derelomus* in appearance, but differs by the nearly contiguous front coxæ and broadly toothed claws." Champion has united the two in the Biologia.

KEY TO SPECIES OF DERELOMUS.

a. Larger, 2—4 mm.; second joint of funicle longer than third; reddish-brown, the head and thorax usually wholly or in part black. 257. BICOLOR.

aa. Smaller, less than 2 mm.; second and third joints of funicle subequal; nearly uniform pale brownish-yellow, elytra usually with a faint oblique bar near base. 258. BASALIS.

257 (8708). DERELOMUS BICOLOR Lec., 1876, 222.

Reddish-brown; head, beak, thorax and scutellum usually black; elytra with two faint transverse bands slightly darker; legs and antennæ paler. Beak as long as thorax, slightly curved, finely and densely punctured. Thorax as wide as long, sides parallel for three-fourths their length, then rapidly converging to apex; disc alutaceous, finely and rather sparsely punctate. Elytra with rows of feebly impressed punctures; intervals nearly flat, minutely and rather thickly punctate. Length 2.3—4 mm.

Jupiter, Fla., May 5. Enterprise, New Smyrna and Capron, Fla., April and May, on the blossoms of the cabbage palmetto. Of the four specimens at hand from Jupiter, three have the head and beak reddish-brown, the thorax black, while the other is wholly reddish-brown. *N. myricæ* Lec. (1876, 418) was based on a form of *bicolor* having the elytra maculate with brown and the thorax a little more strongly punctate.

258 (8710). Derelomus basalis Lec., 1876, 222.

Oblong, slender, subdepressed. Pale brownish-yellow, head and beak slightly darker; thorax rarely with a broad dorsal brown stripe; elytra each usually with an oblique dark band commencing near base of third interval and running to suture. Beak slender, curved, finely punctured. Thorax slightly longer than wide, strongly constricted near tip, finely alutaceous, minutely and rather sparsely punctate. Elytra with rows of fine, unimpressed punctures; intervals more finely and rather densely punctate. Male with beak as long as thorax, the sides of latter with a distinct cusp in front of middle. Female with beak longer, more slender, the sides of thorax more strongly converging, not angulate in front of middle. Length 1.6—1.8 mm.

Abundant through central and northern Florida: Ormond, Sanford, Dunedin and Sarasota, Jan. 19—Dec. 3. Mobile, Alabama, June 13. Tybee and Honey Islands, Georgia, April 20—June 1. Occurs on the blossoms of the cabbage and saw palmettoes, and especially on those of a dwarf papaw, *Asimina parviflora* Michx., in February and March.

II. Euclyptus Dietz, 1891. (Gr., "well" + "sculptured.")

Beak slender, about as long as head and thorax, strongly curved, neither striate nor carinate; antennal grooves linear, directed against the middle of eyes; funicle pubescent, first joint clavate, as long as the next four, second slightly longer than third, 3—7 wider than long; club obovate, its first joint larger than the others combined; ventral segments very unequal, first and second rather long, third and fourth very short, combined scarcely equalling second, fifth as long or longer than third and fourth united (Fig. 65, *b*—*c*.) Fall, who has recently reviewed the genus (1913, 43), ascribes to it six species, two of which are known from our territory.

KEY TO EASTERN SPECIES OF EUCLYPTUS.

a. Larger, 2 mm.; fifth ventral as long as second and third united; elytra separately rounded at apex, the pygidium freely exposed. 259. testaceus.

aa. Smaller, 1.5 mm.; fifth ventral shorter, as long as third and fourth united; pygidium feebly exposed. 260. ferrugineus.

259 (11,045). Euclyptus testaceus Dietz, 1891, 272.

Elliptic. Pale brownish-yellow, almost glabrous. Beak shining, finely and very sparsely punctate. Thorax slightly flattened, wider than long, sides and base broadly rounded, disc with an ill-defined smooth dorsal line, rather closely and finely punctured. Elytra elongate, wider at base than thorax, striæ impressed, punctures moderate, close-set; intervals scarcely convex, slightly roughened. Length 2 mm.

Described from a single female from Buffalo, N. Y. "In appearance it resembles the common *Notolomus basalis* Lec. of Florida, without, however, the dark basal spot of the elytra." (*Dietz.*)

260 (8564). EUCLYPTUS FERRUGINEUS Lec., 1876, 174.

Oblong-oval. Uniform reddish-brown, very sparsely and finely pubescent. Beak slender, longer than thorax, moderately curved, sparsely and finely punctured. Thorax at middle slightly wider than long, gradually narrowed in front, sides broadly rounded; disc feebly constricted near apex, finely and rather densely punctate. Elytra at base one-third wider than thorax, one-half longer than wide, humeri rounded; striæ deep, their punctures large, close-set; intervals slightly convex, very finely and sparsely punctate, the punctures bearing long, recurved prostrate yellowish hairs. Length 1.5 mm.

Highlands and Anglesea, New Jersey; June—July. Known elsewhere from Iowa, District of Columbia and Florida. Usually listed as a *Phyllotrox*, but Fall, loc. cit., has pointed out that its characters agree more closely with those of the present genus.

Subtribe II. ERIRHINI.

In this group of genera the beak is long, usually slender; antennal grooves directed against the eyes, not converging beneath; scape nearly or quite reaching the eye, first, and usually the second, joint of funicle longer than the others; legs slender, tibiæ truncate at tip and feebly mucronate; tarsi spongy beneath, third joint dilated and bilobed, last joint long, claws simple.

KEY TO GENERA OF SUBTRIBE ERIRHINI.

a. Femora toothed; prosternum not emarginate. III. DORYTOMUS.
aa. Femora not toothed; prosternum emarginate in front.
b. Body densely clothed with scales. IV. GRYPIDIUS.
bb. Body pubescent or glabrous.
c. Antennæ inserted at apical third of beak; joints 1 and 2 of funicle subequal in length. V. NOTARIS.
cc. Antennæ inserted near tip of beak; second joint of funicle one-half shorter than first. VI. PROCAS.

III. DORYTOMUS Steph., 1831. (Gr., "lance" + "joint.")

Oblong or oblong-oval species of medium size, having the body more or less flattened above; thorax narrower than elytra, usually suddenly narrowed and more or less constricted in front, without postocular lobes; body sparsely clothed with short, coarse, prostrate hairs (rarely scales), which are usually much mottled in hue; femoral teeth usually small, sometimes difficult to see even on front femora. The species usually occur on willow, are confused in most collections and are very difficult to separate.

KEY TO EASTERN SPECIES OF DORYTOMUS.

a. Form larger, more robust, length 4.5 or more mm.; beak very long, striate, antennæ inserted near its middle in female.

b. Tooth of front femora small, acute.

c. Thorax finely and sparsely punctured, not constricted near apex; front legs elongated in male. 261. MUCIDUS.

cc. Thorax coarsely, not densely punctured, distinctly constricted near apex; front legs not elongated in male. 262. LATICOLLIS.

bb. Tooth of front femora much larger; dark reddish-yellow, variegated with darker spots; beak and thorax densely punctate. 263. PARVICOLLIS.

aa. Form smaller, narrower; length less than 4.2 mm.; beak shorter, stouter, more nearly straight; antennæ inserted near apical third in both sexes.

d. Body sparsely covered with rather coarse hairs which, except in *brevicollis*, are more or less condensed to form spots or stripes on elytra.

e. Thorax distinctly constricted behind the apex.

f. Elytra without distinct pale stripes; thorax one-half wider than long.

g. Head with a distinct frontal fovea; elytra not or very indistinctly mottled with pale spots.

h. Elytra nearly uniform reddish-brown, each with a faint darker subsutural stripe; femoral tooth small. 264. INDIFFERENS.

hh. Elytra blackish-piceous, sometimes indistinctly mottled with paler spots; femoral tooth large. 265. BREVICOLLIS.

gg. Head without frontal fovea; elytra distinctly mottled with pale spots; femoral tooth large. 266. VAGENOTATUS.

ff. Elytra each with a distinct sublateral pale stripe; thorax scarcely wider than long; femoral tooth very small; frontal fovea small, deep. 267. SUBSIMILIS.

ee. Thorax not or very feebly constricted behind apex.

i. Nearly uniform pale brownish-yellow; pubescence long, coarse; smaller, 3—3.2 mm. 268. RUFUS.

ii. Head and beak piceous or dark reddish-brown; elytra yellowish, each with a broad, darker subsutural stripe; pubescence short, fine; length 4—4.2 mm. 269. FUSCICEPS.

dd. Body covered with small, elongate scales, which are not or only vaguely condensed in spots on elytra; those on thorax forming a broad pale stripe each side. 270. SQUAMOSUS.

261 (8529). DORYTOMUS MUCIDUS Say, 1831, 14; ibid, I, 277.

Oblong, flattened above, convex at sides. Dark reddish-brown, thinly clothed with rather short, prostrate yellowish hairs which are condensed to form pale spots on the elytra; antennæ reddish-brown. Beak very slender, curved, one-half longer than thorax, densely rugose, striate-punctate, male; nearly twice as long as thorax, less densely more finely punctate, female. Basal joint of funicle as long as next four together, second as long as next two. Thorax short, one-half or more wider than long, sides strongly rounded. Elytra parallel to apical third, thence rounded to tips,

the strial punctures coarse, deep, close-set; intervals feebly convex, minutely punctulate. Length 5—6.5 mm.

Lake and Posey counties, Ind., probably throughout the State; May 11—June 28. Beaten from willow. Ranges from Canada and New England to Kansas, south to Georgia and Mississippi. Breeds in the blossoms of cottonwood and develops very rapidly.

262 (8530). DORYTOMUS LATICOLLIS Lec., 1876, 164.

Oblong, subcylindrical, less depressed. Piceous-black, sparsely clothed with short, grayish hairs which form paler spots on elytra. Beak strongly curved, half the length of elytra, very slender, cylindrical, striate and coarsely punctured. Thorax three-fourths wider than long, sides rounded, suddenly narrowed near tip; disc with deep, rather sparse punctures, distinctly coarser than in *mucidus*. Elytra at base one-fourth wider than thorax, sides and strial punctures as in *mucidus;* intervals flat, finely but distinctly punctate. Length 4.5—5 mm.

Lake and Marshall counties, Ind.; scarce. May 7—June 24. Found near New York City on poplar and in the wash-up at Rockaway Beach in June. Ranges from New England and Lake Superior to Iowa. Both it and *mucidus* have been taken on the summit of Mt. Washington, N. H.

(——). DORYTOMUS FROSTII sp. nov.*

Oblong-oval. Uniform reddish-brown, except the meso- and metasterna which are black; above very sparsely, beneath more closely clothed with long, fine, prostrate white hairs. Beak of female as long as head and thorax, carinate, finely and sparsely punctate, antennæ inserted at apical two-fifths. Head finely, not densely punctate; frontal fovea small, deep. Thorax two-thirds wider than long, widest behind middle, sides straight, diverging on basal third, then rounded and constricted near apex; disc finely, densely and evenly punctate without trace of median smooth line. Elytra three times longer than thorax and at base one-third wider than middle of latter, sides feebly diverging from base to behind middle, then broadly rounded to apex; disc with rows of rather fine, deep, close-set punctures; intervals flat, minutely and confusedly punctate. Length 5 mm. (*W. S. B.*)

Described from a single female taken Oct. 5 by C. A. Frost, at Framingham, Mass., and now in his collection. Close to *D. ampla* Casey, described from Colorado, but Col. Casey, who has compared it with his type, writes that *frostii* has a more shining and more closely punctate thorax, without median smooth line as in *ampla*, and shorter, more posteriorly inflated elytra. Named in honor of the collector who has furnished us much data regarding the weevils of New England.

263 (10,877). DORYTOMUS PARVICOLLIS Casey, 1892, 367.

Oblong, subcylindrical. Reddish-brown, irregularly mottled with pice-

*This species was received too late to give it proper placement in the key or its consecutive serial number.

ous-black, thinly clothed with short, pale hairs. Beak of male deeply striate, coarsely and densely punctate, slightly longer than head and thorax; of female, two-thirds as long as elytra, more slender, less sulcate. Basal joint of funicle subequal to the next three combined. Thorax small, one-half wider than long, sides strongly rounded, abruptly narrowed near apex; disc rather finely and very densely punctate. Elytra at base one-third wider than thorax; sides parallel in male, slightly diverging from base in female; strial punctures deep, rather coarse, close-set; intervals nearly flat, minutely and sparsely punctate. Length 4.5—5.5 mm.

Steuben, Marshall and Knox counties, Ind.; June 8—July 5. Occurs also in New Hampshire, Massachusetts and Kentucky.

264 (10,884). DORYTOMUS INDIFFERENS Casey, 1892, 375.

Oblong-oval, rather convex. Dark reddish-brown, shining, the head, beak, sterna and the elytra towards the middle indefinitely black or piceous; elytral suture always narrowly rufous; tip of beak, legs and antennæ paler; body sparsely clothed with short, whitish, prostrate hairs. Beak rather stout, nearly straight, as long as head and thorax in female, slightly shorter in male; sulcate, coarsely and densely punctate. Thorax one-half wider than long, sides broadly curved, disc abruptly, not strongly constricted behind the apex, coarsely, deeply and densely punctate. Elytra at base two-fifths wider than thorax; striæ feebly impressed, the punctures deep and close-set; intervals three times as wide as punctures, minutely punctate. Length 3—4 mm.

Posey County, Indiana, scarce; April 13—25. Found at several localities near New York City, in April and June, rolling up leaves of aspen, *Populus grandidentata* Michx. Ranges from Newfoundland and New York to Iowa and Kansas.

265 (8532). DORYTOMUS BREVICOLLIS Lec., 1876, 165.

Oblong, rather slender, convex. Blackish-piceous, shining; rather thickly clothed with whitish hairs which are rarely condensed to form small, remote spots on elytra; antennæ and legs reddish-brown. Beak as long as head and thorax, finely sulcate, deeply and coarsely punctate. Thorax one-half wider than long, sides broadly rounded, disc constricted behind the apex, densely and rather coarsely punctured. Elytra at base one-third wider than thorax, sides straight and parallel, rounded on apical third; strial punctures coarse, deep, close-set. Length 3.5—4.2 mm.

Lake County, Indiana; Oct. 14. Frequent near New York City on pussy willow, May and November. Ranges from Ontario and New York to Minnesota and Vancouver, B. C.

266 (10,885). DORYTOMUS VAGENOTATUS Casey, 1892, 376.

Oblong, narrow, feebly convex. Piceous-brown, distinctly mottled with numerous small spots of short whitish hairs; antennæ, except club, tibiæ, sides of thorax, humeri, and sometimes an ill-defined narrow submarginal stripe on each elytron pale reddish-brown. Beak as long as head and thorax, male, one-third longer, female, finely sulcate, deeply and densely punctate. Thorax one-half wider than long, sides broadly round-

ed, strongly constricted behind the apex; disc very deeply, densely and rather coarsely punctate. Elytra at base one-third wider than thorax, sides straight and parallel to apical fourth, then obtusely rounded to tips; striæ fine, their punctures rather coarse, deep and close-set; intervals flat. Length 3.2—3.6 mm.

Marshall County, Indiana; June 24. The type was from that State. Easily known by its small size, lack of frontal fovea, spots on elytra and large femoral tooth.

267 (——). Dorytomus subsimilis sp. nov.

Elongate-oblong, slender. Black, very sparsely clothed with fine whitish hairs which are condensed to form very small scattered spots on the elytra; antennæ, tarsi, tips of beak and tibiæ, and a narrow stripe along the fifth and sixth intervals of elytra, extending from humerus to apical fourth, pale reddish-brown. Beak rather stout, as long as thorax, male, as head and thorax, female, finely striate, densely and coarsely reticulate-punctate. Thorax subglobose, scarcely wider than long, sides broadly rounded; disc broadly but distinctly constricted near apex, finely, deeply, not densely punctate, the intervals between the punctures alutaceous. Elytra at base one-third wider than thorax, sides parallel to apical fourth, then converging to the rounded apex; striæ coarse, rather deep, their punctures coarse, close-set; intervals feebly convex. Under surface finely and sparsely punctate. Length 3—3.2 mm. (*W. S. B.*)

Kosciusko County, Indiana, rare; June 5. "Illinois" in LeConte collection. Sherborn, Massachusetts, March 30, (Liljeblad collection). C. A. Frost states that at Sherborn both this species and *brevicollis* were found boring the ovaries of willows on the date mentioned. It was determined for him as *vagenotatus* by Col. Casey, but that author, when additional specimens were sent him, accompanied by notations of discrepancies in his original description, wrote that he had compared it with the types of *vagenotatus* and that it was distinct and unknown to him. While resembling *vagenotatus* superficially, it differs in its smaller size, stouter and shorter beak, distinct frontal fovea, narrower and more globose thorax, much smaller femoral tooth and distinct pale stripe of elytra. From *brevicollis* it also differs in the last three characters mentioned.

268 (——). Dorytomus rufus Say, 1831, 25; ibid, I, 293.

Oblong, feebly convex. Pale brownish-yellow throughout, rather thickly clothed with coarse, whitish prostrate hairs; elytra sometimes feebly clouded with brownish toward middle. Beak rather stout, feebly curved, slightly longer than head and thorax, sulcate, densely and coarsely punctate. Thorax one-third wider than long, sides broadly rounded, more strongly near apex; disc rather coarsely, deeply and densely punctate. Elytra at base one-third wider than thorax, parallel, obtusely rounded on apical third, sutural notch small, deep; strial punctures coarse, deep, close-set; intervals flat, finely punctate. Femora stout, the tooth very small. Length 3—3.2 mm.

Knox County, Ind., rare; June 8. Described from Missouri. Known from Kansas and Mississippi. Easily known by the small size, uniform pale color and rather coarse hairs. The above description is that of *rufus* as determined by Casey. Say's description is too brief and we are very doubtful whether it is his species, as he describes it as an *Erirhinus* says nothing of the femora being toothed, states that the body is covered with numerous oblong whitish prostrate scales, gives the length as one-tenth of an inch (2.5 mm.), and states that "the suture is indented near the scutel, the latter not very obvious," characters which do not agree with Casey's *rufus*.

269 (10,886). Dorytomus fusciceps Casey, 1892, 377.

Oblong, rather broad, subdepressed. Color given in key; sterna piceous; elytra with a few small faint spots of pale hairs. Head densely punctate and with a small frontal fovea. Beak as long as head and thorax, sulcate and punctate; first joint of funicle as long as the next three. Thorax short, three-fourths wider than long, widest at middle, the sides thence feebly converging to base, more strongly so to apex; disc rather finely, very densely punctate. Elytra broad, one-third wider and three times as long as thorax; striæ deep, their punctures close-set; intervals flat, finely and densely punctate. Femoral tooth small, acute. Length 4—4.3 mm.

Described from Iowa. Known also from Detroit, Mich., and in the LeConte collection from New York. Larger and broader than the preceding, with the dark stripes of elytra distinct and the subapical constriction of thorax wholly obsolete.

270 (8536). Dorytomus squamosus Lec., 1876, 166.

Oblong-convex. Uniform, dark reddish-brown, thinly clothed with yellowish elongate, scale-like hairs. Beak as long as head and thorax, not striate, finely punctate. Thorax slightly wider than long, sides broadly rounded, feebly but distinctly constricted behind the apex, very deeply, finely and densely punctate. Elytra at base one-third wider than thorax; strial punctures rather coarse, each bearing a distinct elongate scale; intervals, broad, minutely punctate. Femora rather slender, the tooth minute. Length 2.7—3.5 mm.

Lake County, Ind., scarce; June 24. Known from Illinois, Kentucky, Kansas, Colorado and Arizona. Breeds in galls which occur on willow. *Elleschus angustatus* Dietz is a synonym.

IV. Grypidius Schön., 1826. (Gr., "curved" + "form.")

Short, broad species having the beak cylindrical, curved; antennæ inserted at its apical two-fifths, scape slender, not reaching the eye, first two joints of funicle subequal, each as long as the next three united; thorax with feeble ocular lobes; scutellum

small, oblong; fifth ventral small, the third, fourth and fifth united but little longer than the second; tibiæ straight, angulate near tip, armed with a minute curved spine.

271 (8540). GRYPIDIUS EQUISETI Fab., 1798, 403.

Oblong-oval, robust. Black, above densely clothed with pale gray and piceous-brown scales, the gray ones forming a broad stripe each side of thorax and elytra and covering the declivity of the latter; middle of thorax black, not scaly, antennæ, tibiæ and tarsi reddish-brown. Beak longer than head and thorax, very slender, curved, rather coarsely and closely punctate, finely carinate. Thorax subglobose, sides broadly rounded, apex and base truncate, disc very densely and finely punctate. Elytra broad, subdepressed, humeri rounded, prominent; sides parallel to the declivity, thence strongly converging to apex; striæ fine, obsoletely punctate; intervals broad, flat, the third and fifth elevated behind the middle to form one or two elongate tubercles. Prosternum scaly; meso- and metasterna and abdomen glabrous, densely and coarsely punctate. Length 5—6 mm.

Orono, Maine, June 15. Batavia and Sport Island, N. Y., June 4—24. "A common European species indigenous in Canada, Kansas, and on the north shore of Lake Superior." (*LeConte.*) Recorded also from Iowa, Washington and Wyoming.

V. NOTARIS Germ., 1817.

Species of moderate size having the front margin of prosternum deeply emarginate; femora moderately clavate, not toothed; postocular lobes of thorax distinct and wide; hind tibiæ feebly mucronate; apical sutures of second, third and fourth ventral segments very prominent. Two species (formerly placed under *Erycus*) occur in the Eastern States.

KEY TO EASTERN SPECIES OF NOTARIS.

a. Surface distinctly but minutely pubescent; thorax densely and coarsely punctate; elytral striæ with coarse, deep punctures. 272. PUNCTICOLLIS.

aa. Surface subglabrous, shining; thorax sparsely punctate; striæ with small, close-set punctures. 273. ÆTHIOPS.

272 (8543). NOTARIS PUNCTICOLLIS Lec., 1876, 163.

Oblong-ovate. Black or dark reddish-brown, very sparsely clothed with short, prostrate yellowish hairs, which often form a sutural transverse spot behind the middle of elytra. Beak slender, cylindrical, curved, longer than thorax, coarsely punctate. Antennal club as long as the preceding four joints (Fig. 65, *a.*) Thorax subglobose, as long as wide, sides feebly rounded, disc densely and coarsely punctate. Elytra one-half wider than thorax, humeri rounded, sides parallel to behind the middle, then rapidly converging to the obtuse apex: intervals flat, finely and densely rugose-punctate. Under surface coarsely and densely punctate. Length 4.8—6.5 mm.

Lake, Laporte, Vigo and Perry counties, Ind., scarce; May 3—August 26. Taken on the arrow-arum, *Peltandra virginica* L. Found near New York City at Snake Hill, March, April; on salt meadows early in spring, and at various localities from May to September. Ithaca, Batavia and Portage, N. Y.; March 10—June 21. Framingham, Mass., common under stones along meadows, April. Ranges from Newfoundland and Quebec to Minnesota, north of the Ohio River. "Breeds in swamps" (*Hamilton*); perhaps in the *Peltandra* above mentioned, which is a swamp plant. Webster (Insect Life, VII, 206) has recorded it as attacking cabbages, gouging great cavities in the stems of young plants and later attacking the bases of the larger leaves from beneath.

273 (8542). NOTARIS ÆTHIOPS Fab., 1792, I, 405.

Oblong-oval. Dark reddish-brown; head, basal half of beak and greater part of under surface piceous. Beak as long as head and thorax, slender, feebly curved, finely and rather sparsely punctate. Thorax one-half wider than long, sides strongly rounded; disc sparsely, deeply and rather coarsely punctate and with a narrow entire median line. Elytra one-third wider than thorax, striæ deep, intervals feebly convex, each with numerous scattered minute punctures. Under surface finely and densely punctured. Length 5.7—6 mm.

Mt. Washington, New Hampshire, July 6. A circumpolar species occurring in Europe, Asia and Canada, ranging from New England to Lake Superior and Wyoming. *N. morio* Mann. is a synonym.

VI. PROCAS Steph., 1831. (A proper name.)

Close to *Notaris*. Beak less slender, not longer than thorax, swollen at tip; antennæ inserted at apical fifth, joints 1—3 of funicle obconical, gradually decreasing in length, 4—7 rounded, equal; club long, pointed; prosternum and postocular lobes as in *Notaris;* tibiæ strongly pubescent, truncate at tip, the hind one with two small terminal spines.

274 (8544). PROCAS LECONTEI Bedel, 1879, p. XVIII.

Oblong-oval. Black, opaque, slightly mottled with spots of fine gray pubescence; antennæ, tibiæ and tarsi reddish-brown. Head and beak very densely punctured. Thorax rather small, subglobose, slightly wider than long, sides strongly rounded, disc narrower and slightly constricted in front, finely and very densely punctured. Elytra oblong, one-third wider at base than thorax, humeri rounded, sides parallel to apical third; striæ deep, catenate with distant punctures; intervals wide, flat, finely and densely rugose and subgranulate. Length 5—5.3 mm.

Described as *picipes* by LeConte from Lake Superior. Known from Ottawa, Canada. The elytra are shorter, proportionally broader and more depressed than in the preceding species.

Subtribe III. Smicronychi.

This subtribe, equivalent to the Desmorhines of LeConte and the Desmori of Dietz, comprises small oval or oblong-oval species primarily distinguished by the basal constriction of beak and connate claws, as mentioned in key. In addition they have the body more or less scaly; head moderately large, spherical; eyes transversely oval, coarsely granulated, separated beneath; thorax usually more or less globose, narrowed in front and constricted behind the apex, the postocular lobes generally distinct; elytra striate-punctate, wider at base than thorax; prosternum emarginate in front; femora more or less clavate, unarmed; tibiæ with short apical spurs, tarsi slender, the third joint bilobed (Fig. 65, *j*—*l*.) In the males the beak is shorter and stouter, with the antennæ usually inserted much nearer tip than in the females. On account of the great number of species, the small size and dull colors they constitute one of the most difficult groups of the entire order, and the following tables and descriptions, based mainly upon those of Casey and Dietz, are not without their faults.

By Casey and others the three genera below given are considered as one, all species being placed under *Smicronyx*. While the characters separating the three may appear trivial, and the species of *Pachyphanes* and the first group of *Smicronyx* seemingly very closely related, yet they will be found to serve the purpose in lessening the difficulties of handling a very unwieldy group. Therefore the genera as founded by LeConte, and with minor changes retained by Dietz, are kept by us.

KEY TO EASTERN GENERA OF SMICRONYCHI.

a. Antennal club large, elongate, always distinct from the funicle (Fig. 65, *h*.); elytra oval, strongly convex, conjointly at most one-half longer than wide. VII. Pachyphanes.

aa. Antennal club small, suboval, often subcontinuous with the funicle (Fig. 65, *i*.).

b. Eyes more widely separated beneath; hind tibiæ mucronate (Fig. 65, *f*.); elytra much as in *Pachyphanes;* size usually larger. VIII. Desmoris.

bb. Eyes narrowly separated beneath; all the tibiæ hooked or clawed (Fig. 65, *g*., *j*.); elytra, except in the first group, less convex, more elongate, their sides parallel for one-half or more their length. (Fig. 66, *d*., *e*.) IX. Smicronyx.

VII. Pachyphanes Dietz, 1894. (Gr., "thick"+"appearance.")

Small but stout convex species having the beak strongly curved; antennæ inserted two-fifths from apex, male, nearer the middle, female; second joint of funicle longer than third, 4—7 very little wider; tibiæ all with distinct spurs. The species are usually listed under the name *Pachytychius* Jek., to which they were wrongly ascribed by LeConte. Four of the eight recognized by Dietz occurs with us.

KEY TO EASTERN SPECIES OF PACHYPHANES.

a. Fifth elytral interval densely clothed with white scales nearly throughout its length; first and second joints of funicle elongate, slender, subequal in length. 275. LINEOLATUS.

aa. Fifth interval not conspicuously scaly; second joint of funicle distinctly shorter than first. (Fig. 65, *h*.)

b. Thorax distinctly narrower than the base of elytra, the latter usually with a large median subbasal area of darker brown or blackish scales; fourth joint of front tarsi much longer than third.

c. Scales of elytra white; scutellum not visible; form broader, more robust; length 3—3.5 mm. 276. DISCOIDEUS.

cc. Scales of elytra dirty yellow; scutellum distinct, small, glabrous; form narrower, more slender; length 2—2.8 mm. 277. CORPULENTUS.

bb. Thorax at middle but slightly narrower than base of elytra, its disc with two white stripes; scutellum distinct but very small; fourth joint of front tarsi not longer than third. 278. AMŒNUS.

275 (10,891). Pachyphanes lineolatus Casey, 1892, 385.

Oblong-oval, robust, convex. Black, feebly shining, the bases of third and seventh intervals of elytra, and the fifth throughout most of its length, densely covered with white scales; abdomen and thoracic side pieces also densely scaly; antennæ piceous, tibiæ reddish-brown. Beak rather slender, evenly curved, as long as head and thorax, male, three-fifths as long as elytra, female. Thorax one-fourth wider than long, sides broadly rounded, disc broadly constricted near apex, densely and finely punctate. Elytra at base nearly one-half wider than thorax, humeri prominent; sides subparallel on basal half, thence strongly converging to apex; striæ rather fine, deep, their punctures elongate, indistinct; intervals wide, flat. Length 3—3.5 mm. (Fig. 66, *b*.)

Lake and Marshall counties, Indiana, scarce; May 30—July 15. Recorded from Illinois, Texas and Missouri. Easily known by the dull black color, arrangement of scales on elytral intervals and reddish tibiæ. The punctures on the middle of thorax are transversely oval.

276 (8548). Pachyphanes discoideus Lec., 1876, 169.

Oval, robust, convex. Black, everywhere densely clothed with oval, whitish and pitchy black scales, the latter forming a broad, irregular

median space on thorax and a large subquadrate median area on basal half of elytra, with a dark spot each side behind the middle, the scales usually eroded, leaving these dark areas bare; legs dark reddish-brown to piceous. Beak rather stout, as long as head and thorax, male, two-thirds as long as elytra, female, densely punctate. Thorax subglobose, two-fifths wider than long, widest at middle, sides strongly rounded; disc feebly constricted behind the apex, densely and coarsely punctate, the punctures concealed by large scales. Elytra at base one-third wider than thorax, sides broadly rounded for two-thirds their length then strongly converging to apex; disc convex, striæ coarsely punctured, intervals flat. Length 3—3.5 mm. (Fig. 66, *a*.)

Fountain County, Indiana, rare; June 10. Bowmanville, Ill., June 29. Ranges from New York to California, south to Texas. Schwarz records it (1884, 84) as breeding in the flower-heads of the fine-leaved sneezeweed, *Helenium tenuifolium* Nutt.

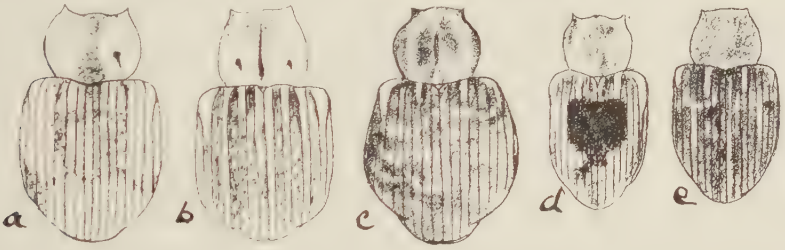


Fig. 66. *a, Pachyphanes discoideus; b, P. lineolatus; c, Smicronyx squalidus; d, S. quadrifer; e, S. squamulatus.* (After Dietz.)

277 (8549). PACHYPHANES CORPULENTUS Lec., 1876, 170.

Oval, rather slender. Piceous-black, thickly clothed with elongate-oval, overlapping clay-yellow scales; elytra usually with a large basal median area of brown scales as in *discoideus;* legs red, antennæ and tarsi darker. Beak as long as head and thorax, finely and sparsely punctate, male; three-fifths as long as elytra, almost smooth except near base, female. Thorax one-half wider than long, sides strongly rounded, disc finely and densely punctured. Elytra oval, at base one-third wider than thorax at middle, humeri prominent; sides parallel to middle, then strongly converging to apex; striæ fine, intervals flat. Length 2—2.8 mm.

Agricultural College, Miss., July. Known also from Louisiana, Arkansas and Texas. The type of *P. centralis* Dietz from Texas is not separable from *corpulentus* by the characters he gives and we regard it as a synonym.

278 (8547). PACHYPHANES AMŒNUS Say, 1831, 25; ibid, I, 294.

Broadly oval, convex. Black or piceous, above densely clothed with whitish and dark brown scales; thorax, at least on basal half, with two widely separated discal stripes and a stripe each side formed of the pale scales; elytra with humeri, a basal line on third interval and some irregular spots and wavy lines also pale; antennæ and legs reddish-brown; under surface

thickly clothed with pale scales. Beak stout, longer than head and thorax, densely scaly, finely striate, rugose-punctate, and with two tufts of scales at base. Thorax globose, widest at middle, sides strongly rounded, disc densely and finely punctate. Elytra at base slightly wider than thorax at middle, humeri prominent, sides broadly rounded and gradually converging to a rounded apex; striæ deep, distinctly punctate; intervals flat, each with a row of minute, suberect setæ. Length 2.2—2.7 mm.

Putnam County, Ind., scarce; June 5. Various localities near New York City, July—September. Ranges from New York to Lake Superior and Dakota, south to the District of Columbia and Texas. Occurs on dodder (*Ulke*); ragweed (*Hamilton*); sneezeweed and horsemint (*Pierce*). Confused in collections with *Smicronyx squalidus* and *tessellatus* but the thorax is much wider than in either, and its discal stripes always distinct from base to middle.

VIII. Desmoris Lec., 1876. (Gr., "chain.")

Small robust species having the beak of males stout, nearly straight, punctured and opaque; of females, much longer, very slender, filiform, usually polished throughout as in *Balaninus;* eyes large, tranverse, widely separated beneath; antennæ long and slender, the second joint of funicle longer than the third, club small, pubescent, or with the basal joint glabrous; elytra wider than thorax, striæ deep, slightly punctured; tarsi slender, third joint broadly bilobed. Five of the 12 species recognized by Dietz occur in our territory.

KEY TO EASTERN SPECIES OF DESMORIS.

a. Larger, 4.2—5 mm.; scales grayish-yellow, elytra faintly mottled with paler brown; antennæ inserted one-third from apex, male, or about the middle, female. 279. SCAPALIS.

aa. Smaller, not over 3.7 mm.; antennæ inserted just before the middle, male, one-third from base, female.

b. First and second joints of funicle slender, subequal in length; scales uniform grayish-white; length 2.8—3.4 mm. 280. PERVISUS.

bb. First joint of funicle distinctly longer than second.

c. Scales of elytra mottled with brown; thorax not constricted at apex; form robust. 281. FLORIDANUS.

cc. Scales uniform gray or grayish-white; thorax constricted behind the apex.

d. Larger, 3.5—3.7 mm.; thorax densely punctate; first joint of funicle one-third longer than second. 282. CONSTRICTUS.

dd. Smaller, less than 3.5 mm.; thorax more finely and sparsely punctate; first joint of funicle three-fifths longer than second. 283. SORDIDUS.

279 (8545). Desmoris scapalis Lec., 1876, 168.

Oval, convex. Black or dark brown, rather densely clothed above and beneath with grayish-yellow scales; those of upper surface oval, more condensed and forming wavy transverse markings on the elytra, those of under surface rounded, smaller and paler; legs dull red, femora blackish at base. Beak of male as long as head and thorax, densely punctured on basal two-thirds, more finely toward apex; of female, one-third longer, more slender, almost straight, polished and very sparsely punctate in front of antennæ. First and second joints of funicle subequal, male, first two-thirds the longer, female. Thorax as wide as long, sides feebly rounded, not constricted near apex, male; one-third wider than long, rather strongly rounded, distinctly constricted near apex, female; disc rather coarsely, deeply and densely punctate. Elytra oval, at base one-third wider than thorax, conjointly but little more than one-half longer than wide; sides parallel in basal half, then gradually curved to the rounded apex; striæ fine, deep, obscurely punctate; intervals wide, flat, the alternate ones slightly narrower in female. Length 4.2—5 mm. (Fig. 67.)

Fig. 67. Upper and side views, × 6. (After Hunter & Hinds.)

Palos Park, Edgebrook and Chicago, Ill.; June 4 August 25. Summit of Mt. Washington, New Hampshire (*Dodge*). Known also from Kansas, Colorado and Texas. According to Pierce (1907, 263) it occurs in Texas especially on a species of Compositæ, *Siderauthus rubiginosus* T. & G., the adults feeding on the tender leaf-buds in June and July, and the larvæ in the heads among the achenes. This is our largest species of the subtribe. As the description shows, the sexes differ not only in the usual characters of beak, but also in form of thorax and length of antennal joints. *D. compar* Dietz is the female.

280 (10,896). Desmoris pervisus Dietz, 1894, 125.

Elongate-oval. Piceous or dark reddish-brown, the antennæ, legs and apical third of beak usually paler; above rather sparsely, beneath more densely, clothed with oval grayish-white scales. Beak slender, cylindrical, as long as head and thorax, scaly and distinctly punctate from base to antennæ, naked and nearly smooth beyond, male; one-half longer and polished beyond antennæ, female. Thorax about as wide as long, sides broadly rounded from base to beyond middle, thence converging to the narrowed but not constricted apex; disc rather finely, not densely punctate and usually with a narrow, smooth median line on apical two-thirds. Elytra nearly one-half wider at base than thorax, humeri prominent, base truncate; sides nearly straight to beyond middle, then gradually curved to

apex; striæ as in *scapalis;* intervals flat, each with three of four rows of alternating but not overlapping gray scales, these often in part abraded. Length 2.8—3.4 mm.

Beaver Dam, Wisconsin, July 21. Palos Park, Illinois, May 30. Recorded from Dakota, Kansas and California. These records include those of *D. incertus* Dietz, an examination of the type of the latter showing the two species to be identical, as surmised by their author.

281 (10,898). DESMORIS FLORIDANUS Dietz, 1894, 126.

Oval, robust, convex. Piceous, above rather sparsely clothed with small oval, grayish-white scales; elytra with humeri and base of third interval paler, the disc with dark brownish scales intermixed; under surface densely scaly; legs paler. Beak of male rather stout, coarsely punctate and scaly from base to insertion of antennæ, smoother and subcarinate beyond. Thorax slightly wider than long, sides rounded; disc densely and rather coarsely punctured and with an abbreviated median smooth line. Elytra one-third wider at base than thorax; strial punctures distinct; intervals flat, equal, finely rugose-punctulate. Length 3.7 mm.

Described from two males from Florida in the Ulke collection.

282 (8546). DESMORIS CONSTRICTUS Say, 1823, 313; ibid, II, 176.

Oblong-oval, robust. Dark reddish-brown to piceous, above rather sparsely, beneath densely clothed with oblong grayish scales; antennæ, legs and tip of beak usually dark reddish-brown, often black in male. Beak of male stout, finely punctate, as long as head and thorax, scaly from base to insertion of antennæ; of female as long as elytra, polished throughout, glabrous, except near base. Thorax subglobose, as wide as long, widest at middle, sides broadly rounded, disc densely and rather finely punctate, with a more or less abbreviated smooth line at middle. Elytra one-third wider at base than thorax, two-thirds longer than wide, humeri rounded, sides parallel to middle, then gradually rounded to apex; disc feebly but distinctly impressed behind the humeri; striæ fine, deep, obsoletely punctate; intervals flat, each with a single row of minute inclined setæ. Length 3.5—3.7 mm.

Lake, Starke, Martin and Posey counties, Indiana, scarce; June 4—August 23. Smith's list contains New Jersey records by Dietz and Bischoff. Ranges from New Jersey to Iowa, Texas, New Mexico and California. Known as the "sunflower weevil," the larvæ breeding in the seeds of sunflowers and pupating in the ground. The beak of female is much longer and less scaly at base than in *perrisus;* the elytra are shorter and the humeri less prominent than there.

283 (8559). DESMORIS SORDIDUS Lec., 1876, 173.

Oblong-oval, convex. Dark reddish-brown to piceous, densely clothed with rather large oval grayish scales, those of under surface silvery white; antennæ, legs and tip of beak reddish brown. Beak of male scarcely as long

as head and thorax, distinctly tapering, scaly and coarsely punctate except near apex; of female much more slender, evenly cylindrical, one-half longer than head and thorax, smooth, polished and naked except near base. Thorax convex, as wide as long, sides broadly rounded, the apex three-fourths as wide as base; disc finely and rather sparsely punctate, without median smooth line. Elytra at base one-third wider than thorax, not impressed behind the humeri, striæ not obviously punctate, otherwise much as in *constrictus*. Length 2.5—3 mm.

Highland Park, Chicago, Illinois; Sept. 9. Known elsewhere from Texas to Arizona. Specimens were compared with the types in the Cambridge museum.

IX. Smicronyx Schön., 1843. (Gr., "small" + "claw.")

A large genus of small, subovate, robust species having the beak shorter than in *Desmoris*, strongly constricted at base; front scaly; eyes transversely oval, narrowly separated beneath; thorax usually narrowed in front and constricted near apex, postocular lobes usually present; scutellum small, distinct; elytra wider at base than disc of thorax, usually acutely rounded to apex; tarsal claws connate to a variable extent. More than 60 species of the genus have been named from the United States, mostly by Casey and Dietz in the papers cited. Of these, 26, none over 3.5 mm. in length are known from our territory. The tables of Dietz are unsatisfactory, especially the characters separating his primary divisions which, even if well grounded, are very difficult to make out. We have, therefore, followed for the most part the classification of Casey, separating our species into three groups and modifying his keys in order to include the valid species of Dietz which were later described.

KEY TO GROUPS OF EASTERN SPECIES OF SMICRONYX.

a. Elytra more or less distinctly inflated, rounded on the sides, widest about the middle, conjointly at most one-half longer than wide. (Fig. 66, *c.*) Group I, p. 207.

aa. Elytra not at all inflated, much longer than wide, parallel at sides toward base. (Fig. 66, *d.*, *e.*)

b. Scales of elytra almost uniform in size and density over the entire surface, either uniform in coloration or more or less mottled. Group II, p. 210.

bb. Scales of elytra very uneven, condensed in spots or transverse wavy bands or lines, in which the scales become larger and generally paler in color. Group III, p. 216.

Group I.

Strongly convex species with elytra more or less ventricose or oval, widest about the middle; beak longer than head and thorax.

generally robust, male, slender, female; antennæ inserted two-fifths from apex, males, at middle, females; fourth joint of tarsi scarcely longer than third, claws very small.

KEY TO EASTERN SPECIES OF GROUP I.

a. Elytra in great part reddish-brown; thoracic punctures reniform or sublunate. 284. GIBBIROSTRIS.

aa. Elytra black; thoracic punctures large, rounded.

b. Larger, 2.5—3.2 mm.; claws closely approximate, connate beyond the middle.

c. Thorax much wider than long; scales dark brown or blackish, conspicuously mottled with white. 285. SQUALIDUS.

cc. Thorax not or very little wider than long; scales brown, inconspicuously mottled with paler. 286. MORIO.

bb. Smaller, 2—2.5 mm.; claws moderately divergent, not connate beyond middle.

d. Thorax wider than long; beak not impressed before the basal constriction.

e. Scales larger, mostly grayish-white; setæ quite conspicuous; second joint of funicle distinctly longer than third. 287. OVIPENNIS.

ee. Scales of elytra dark brown, strongly mottled with white; setæ scarcely visible; second joint of funicle scarcely longer than third. 288. TESSELLATUS.

dd. Thorax scarcely wider than long; beak broadly impressed before the constriction (Fig. 65, *m.*); elytra brownish, indistinctly mottled with paler. 289. IMPRESSIROSTRIS.

284 (10,922). SMICRONYX GIBBIROSTRIS Casey, 1892, 407.

Oval, robust, convex. Black, elytra pale reddish-brown, narrowly blackish along the suture; legs, except base of femora, reddish-brown; upper surface sparsely and unevenly clothed with yellowish scales and fine scale-like hairs, the former more dense on the sides and base of thorax and in spots and short bars on elytra; under surface rather densely scaly. Beak of male stout, slightly longer than head and thorax, feebly curved, densely punctate. Thorax one-third wider than long, the sides broadly rounded, convergent toward apex, disc densely and finely punctate. Elytra at base one-third wider than thorax, one-fourth longer than wide, sides parallel to behind the middle, thence converging to tips; striæ deep, distinct. Length 2 mm.

Known from Delaware and District of Columbia. Differs from *sculpticollis*, our other species with the elytra of similar color, in its larger, more densely sculptured thorax and much shorter elytra.

285 (10,901). SMICRONYX SQUALIDUS Casey, 1892, 407.

Oval, strongly convex. Black or piceous, densely clothed above with rather large brown and white overlapping scales, the latter usually predominating; beneath with very small rounded, yellowish-white ones;

thorax with sometimes a narrow median line and two small discal spots each side pale; legs dark reddish-brown. Beak of male stout, feebly curved, roughly punctured and scaly throughout; of female, more slender, two-thirds as long as elytra, finely and densely punctate, polished on apical half. Thorax one-fourth wider than long, widest at middle, sides strongly curved, distinctly constricted near apex; disc densely and coarsely punctured. Elytra one-third wider at base than thorax, one-fourth longer than wide, distinctly wider at middle than base; striæ rather shallow, their punctures remote and indistinct; intervals flat, minutely and sparsely setose. Length 2.5—3 mm. (Fig. 66, *c*.)

Southern half of Indiana, scarce; Kosciusko County, only in the north; May 6—August 26. Known also from Pennsylvania, District of Columbia, Ohio and Illinois. "A common eastern form resembling *oripennis* but with a much larger, more inflated thorax, more elongate beak and longer second funicular joint." (*Casey.*) *S. setulosus* Dietz is only a small form, less maculate above, and with the elytral setæ a little more conspicuous.

286 (10,904). SMICRONYX MORIO Dietz, 1894, 133.

Ovate, convex. Piceous; above densely clothed with closely impressed dark brown or blackish scales, mottled with pale brown or white ones; beneath grayish-white; antennæ and legs dark reddish-brown. Beak longer than head and thorax, feebly curved, coarsely punctured and sparsely scaly from base to insertion of antennæ, finely punctulate and shining on apical half. First joint of funicle longer than second, the latter one-half longer than third. Thorax about as long as wide, sides regularly rounded, apex three-fourth as wide as base, disc densely not coarsely punctured, Elytra at base two-fifths wider than thorax, oval, convex, widest at middle, sides rounded; striæ distinct, their punctures conspicuous, remote; setæ of intervals very fine and short. Length 2.7—3 mm.

Described from Pennsylvania and Dakota.

287 (8550). SMICRONYX OVIPENNIS Lec., 1876, 170.

Oval, robust, strongly convex. Piceous black, above rather densely clothed with rather large gray scales; antennæ and legs dark reddish-brown. Beak as long as head and thorax, coarsely punctured, scaly from base to middle. Thorax slightly wider than long, sides broadly rounded, disc feebly constricted near apex, densely and rather finely punctured. Elytra ovate, at base nearly one-half wider than thorax, humeri rounded, prominent; striæ deep, their punctures distant; intervals wide, flat. Length 2—2.5 mm.

Vigo County, Indiana, rare; May 15. Ranges from Ohio and Michigan to Kansas and Texas. Casey's *squalidus* and Dietz's *tessellatus* are confused in most collections with this species.

288 (10,905). SMICRONYX TESSELLATUS Dietz, 1894, 134.

Short, ovate, strongly convex. Dark reddish-brown to black; above very densely covered with brown and white scales, the latter larger and forming a narrow median line and a short stripe each side of thorax and

numerous short, transverse lines on elytra; under surface densely clothed with large white or yellowish-white scales; antennæ and legs reddish-brown. Beak of male slightly longer than head and thorax, densely punctured and scaly from base to beyond middle; of female much longer and shining towards apex. First joint of funicle stout, second very little longer than third. Thorax slightly wider than long, narrowed in front, sides nearly straight behind the middle, strongly rounded in front, densely and rather coarsely punctate. Elytra oval, two-fifths wider at base than thorax, widest at middle, humeri rounded, prominent; striæ rather wide, coarsely and remotely punctate; intervals flat, their setæ indistinct, inclined. Length 2—2.4 mm.

Frequent throughout Indiana; May 14—July 29. Taken from the leaves of mullein and by sweeping. Known also from District of Columbia and Texas. Differs from *ovipennis* by its more mottled upper surface, less broadly oval elytra, less conspicuous setæ and shorter second joint of funicle. Casey's description of *ovipennis* is evidently of this species as it does not agree with LeConte's type.

289 (10,906). SMICRONYX IMPRESSIROSTRIS Dietz, 1894, 135.

Very close to *tessellatus*. Differs in characters given in key, and in being slightly larger and less convex; in having the pale scales of upper surface smaller and irregularly scattered; second joint of funicle longer; scutellum more evident. Length 2.5 mm.

Kosciusko County, Indiana, rare; June 22. The types of Dietz were from Southern Illinois. The pale mottlings of elytra are indistinct, so that the color of upper surface is a nearly uniform brown.

GROUP II.

This group is represented in our eastern fauna by ten small, oblong or elongate-oval species, all having the elytra more elongate and less inflated than those of Group I, and the scales of nearly uniform size and even distribution.

KEY TO EASTERN SPECIES OF GROUP II.

a. Elytra pale brown with a large common quadrate median or subbasal spot of velvety black. 290. QUADRIFER.

aa. Elytra without quadrate spot as above.

b. Elytra almost or wholly unicolorous, at most with a few widely scattered pale scales.

c. Elytra at least very nearly three times as long as thorax.

d. Scales very dense, widely imbricated; thorax wider than long, its sides distinctly rounded; color grayish-brown. 291. CORNICULATUS.

dd. Scales barely contiguous, scattered over the elytra.

e. Elytra largely reddish; form elongate, slender. 292. CASEYI.

ee. Elytra black; form oblong-oval. 293. SPARSUS.

cc. Elytra distinctly less than three times as long as thorax.

f. Color of body dark reddish-brown, the scales white or nearly so, not dense except on humeri and bases of some of the intervals; beak curved; legs pale reddish-brown.

294. CONNIVENS.

ff. Color black or piceous, the scales mostly gray; legs piceous or dark reddish-brown.

g. Scales dense, broadly oval, gray and yellowish; thorax as long as wide; beak nearly straight (Fig. 65, *o.*)

295. GRISEUS.

gg. Scales sparse, elongate-oblong, uniform gray; thorax one-third wider than long; beak distinctly curved.

296. PINGUIS.

bb. Elytra distinctly mottled with pale and darker scales.

h. Scales of elytra not imbricated; tarsal claws very small, connate to middle or beyond.

i. Form more elongate; basal tufts of beak obsolete; second joint of funicle one-half longer than third; legs piceous.

297. PICIPES.

ii. Form more oval; basal tufts prominent; second joint of funicle scarcely longer than third; legs reddish-brown.

298. POSTICUS.

hh. Scales very dense, imbricated; tarsal claws larger, connate one-third their length; elytra brown with faint white markings; legs reddish-brown. 299. SQUAMULATUS

290 (10,926). SMICRONYX QUADRIFER Casey, 1892, 388.

Oblong-oval. Black; above densely clothed with large pale brown and whitish oval, overlapping scales, the white ones arranged along the sides and middle of thorax and middle of elytra, the latter with a large sutural quadrate piceous spot extending from basal sixth to behind the middle; under surface with yellowish-white, very dense scales; legs reddish-brown, thickly clothed with hair-like scales. Beak of male stout, densely punctured, scaly, as long as head and thorax; of female distinctly longer. Thorax slightly wider than long, constricted near apex, sides feebly curved, disc densely punctured except near apex. Elytra at base two-fifths wider than thorax, sides straight to behind middle, thence broadly rounded to apex; striæ very fine, intervals with short recurved setæ. Length 2.2—2.5 mm. (Fig. 66, *d.*)

Known from Mobile, Alabama, Texas and Arizona. Easily distinguished by the large, velvety black elytral spot.

291 (8562). SMICRONYX CORNICULATUS Fahr., Schön., 1843, Pt. 2, 309.

Oblong-oval, moderately convex. Piceous-black, densely clothed with oval, grayish-brown scales, those of under surface paler; disc of elytra indistinctly fuscous and with a few widely scattered whitish scales, either singly or in pairs; beak and antennæ piceous; club and legs reddish-brown, the former densely pubescent with grayish hairs. Beak of male rather stout, slightly longer than head and thorax, feebly curved, (Fig. 65, *n.*),

punctate, scaly behind the antennal insertion; of female one-third longer, much more slender, feebly tapering. Second joint of funicle one-half longer than third. Thorax small, slightly wider than long, widest at middle, narrowed and feebly constricted near apex, sides broadly rounded, disc coarsely and densely punctured. Elytra at base one-half wider than thorax, two-thirds longer than wide; sides straight and parallel in basal half; striæ fine, indistinctly punctate; intervals flat, finely rugose, each with a row of very fine, recurved setæ. Length 2—2.7 mm.

Starke and Marion counties, Indiana, scarce; Aug. 3—Oct. 31. Taken at various points in New Jersey, May—July. Chicago, Ill., Sept. 20. Ranges from Quebec and Massachusetts south to District of Columbia and west to Wisconsin and Kansas. Taken from the glaucous willow, *Salix discolor* Muhl., in Wisconsin.

The above is a description of the species recognized by Dietz and in part by Casey as the *corniculatus* of Fahræus, the type of which was from Pennsylvania. It agrees fairly well with the original description except in the color of the elytra which was given as "nigra, griseo-tomentosa, fusco-nebulosa." As with many other North American species described in Schönherr's work, the types of which are now in Stockholm and therefore difficult of access, there has been much difference of opinion as to what form Fahræus had in hand. In the Cambridge collection are two species placed side by side, each bearing the label "*S. corniculatus* Fahr.," in LeConte's writing. One of these is what we now know as *sculpticollis*, the other as *apicnides*, both described by Casey. It was probably from the former that LeConte drew up the description (1876, 173), in which he gave the color as "dark brown, not very densely clothed with narrow, small whitish and yellowish scales," and the thorax as "much rounded on the sides." Casey (1892, 391) combined LeConte's *squamulatus* with the form as above described, and his description is a composite of the two. Dietz (1894, 164) described a form practically as above, and then mentions four varieties. These, as lettered in his collection at Cambridge, appear to be *a*, a small form of his *nebulosus*; *c*, the form as above described; *b* and *d*, the *squamulatus* of LeConte, of which Dietz's *columbianus* is a synonym. Until the type of Fahræus is studied by some American Coleopterist familiar with our species of *Smicronyx*, the name *corniculatus* may as well as any other be ascribed to the form in hand.

A study of the type of *S. launginosus* Dietz in the Horn collection shows it to be a dwarf form (2 mm.) of *corniculatus* with the "conspicuous long hair-like setæ" mentioned by Dietz visible only when viewed in profile, and then scarcely if any more ob-

vious than those of *corniculatus* when similarly viewed. We consider it scarcely worthy a varietal name.

292 (——). Smicronyx caseyi Blatch., 1916, 10.

Elongate-oval, slender. Head, thorax, suture of elytra, and under surface black; beak, antennæ, legs, apex of thorax and elytra, except suture, pale reddish-brown; above sparsely clothed with oblong white scales, condensed on sides of thorax and in irregular patches on sides of elytra, elsewhere very unevenly scattered; under surface densely clothed with larger, rounded concave white scales. Beak of male scarcely as long as head and thorax, feebly curved, finely striate, scaly and densely punctate on basal half, naked and more finely punctate towards apex; of female, half as long as elytra, smooth, cylindrical, slightly scaly near base. Antennæ in male inserted at apical third, second joint of funicle half the length of first, scarcely longer than third; of female, inserted behind the middle, second joint as long as the next two. Thorax slightly longer than wide, sides feebly rounded, disc slightly constricted near apex, rather densely and finely punctate. Elytra one-half wider and three times as long as thorax, sides parallel to apical third, then rapidly converging to a subacute apex; striæ fine, indistinctly punctate; intervals feebly convex, minutely transversely rugose, their setæ almost invisible. Length 2 mm.

A single male of this species, bearing the label "*S. restitus* Lec. from Indiana," was donated us by Col. Casey. A comparison with the Kansas type of *restitus* at Cambridge shows that species to be much larger and more robust, with head, beak and thorax wholly black, elytra dull reddish, scales large, close-set and evenly distributed; thorax wider than long; elytra with distinct, coarse inclined setæ. LeConte gives its form, color and vestiture as "Rather robust, convex, black, very densely clothed with grayish and yellowish, broadly oval scales; antennæ and legs ferruginous brown." He states that the intervals are flat, each with a row of whitish hairs and gives the length as 2.75 mm., all of which characters agree with his type of *restitus*. Three specimens of *caseyi*, labelled *restitus* by Dietz, are in the Cambridge collection. Both Col. Casey and Dr. Dietz have misinterpreted LeConte's species as neither one had the type before him when describing the species they call *restitus*, and Dietz (1894, 160) criticises LeConte for not describing the true *restitus* correctly. The range of *caseyi* (*vestitus* Casey and Dietz nec LeConte) is given as Kansas, Dakota, Colorado and Montana, and it is possible that the specimen donated by Casey is as wrongly labelled as to locality as it is to name.

293 (10,912). Smicronyx sparsus Casey, 1892, 394.

Oblong-oval, convex. Deep black throughout, the upper surface clothed with small elongate-oval, whitish scales, uniform throughout and very sparsely scattered over the elytra, the striæ indicated by partings which are

wider than the grooves. Beak of male one-half as long as elytra, slender, cylindrical, evenly curved, scaly on basal half, nearly glabrous toward apex. Thorax slightly wider than long, sides broadly and evenly rounded nearly to apex, which is distinctly constricted; disc deeply and closely, not very coarsely punctate. Elytra at base one-half wider than thorax; sides parallel and nearly straight to middle, thence rounded to apex; striæ fine, deep. Length 2.5 mm.

Described from Colorado and recorded from District of Columbia. Allied to *griseus* but differing in the small, widely scattered scales and black legs.

294 (10,918). SMICRONYX CONNIVENS Casey, 1892, 398.

Oblong-oval, convex. Dark reddish-brown, beak, antennæ and legs throughout paler; above evenly and thickly clothed with rather large white or grayish-white scales which are feebly condensed on sides of thorax and along the suture, more conspicuously so on the humeri and the bases of the third, fifth and seventh intervals; under surface densely covered with smaller, silvery gray scales. Beak of male rather stout, scarcely as long as head and thorax, apical third naked and sparsely punctate, remainder densely punctured and scaly; of female one-third longer, much more slender, polished and smooth in apical three-fifths. Second joint of funicle three-fourths as long as first, equal to the next two. Thorax about as long as wide, sides broadly rounded, disc feebly narrowed in front, finely and rather densely punctate, and with minute rugæ. Elytra at base two-fifths wider than thorax, two-thirds longer than wide, sides straight to beyond the middle; striæ fine, remotely punctate, intervals flat, each with a row of fine brownish, nearly prostrate setæ. Length 1.8—2.3 mm.

Lake, Starke and Wells counties, Indiana, scarce; May 11—August 19. Pawpaw Lake, Mich., July 30. Ramsey and Lake Hopatcong, N. J., September. Known elsewhere from Massachusetts, Maryland, District of Columbia and Missouri. The scales are whiter and much less dense than in *corniculatus*. *S. languidulus* Dietz is the male.

295 (8551). SMICRONYX GRISEUS Lec., 1876, 171.

Elongate-oval, convex. Black or piceous, above rather thinly clothed with rather large yellowish and gray oval scales, those on the thorax narrower, more elongate and directed transversely; the gray ones arranged on the sides of thorax and forming a broad area along the middle of each elytron; beneath densely clothed with small white scales; antennæ and legs dark brown. Beak of male as long as head and thorax, stout, tapering, clothed with scale-like hairs on basal half, (Fig. 65, *o.*); of female two-thirds as long as elytra, very slender, cylindrical, wholly glabrous and shining. Thorax with sides broadly rounded, not constricted near apex, rather finely and closely punctate. Elytra one-third wider and about twice as long as thorax, humeri prominent; striæ feebly impressed, punctured. Length 2—2.3 mm.

Vermillion County, Ind., rare; June 15. Occurs at various points in New Jersey; June to August. Highlands, N. C.; June.

Ranges from there to Nebraska and Dakota, south to Georgia and Texas; occurs on ragweed. A small dark species resembling a *Desmoris* in form but with elytra less inflated.

296 (——). Smicronyx pinguis sp. nov.

Oblong-oval, rather robust. Black, above sparsely clothed with elongate-oblong gray scales, those of side pieces beneath slightly broader and more dense; antennæ and legs dark reddish-brown. Beak of female one-third longer than head and thorax, slender, cylindrical, feebly but evenly curved, almost impunctate, glabrous, except the small tufts at base. Head glabrous, minutely alutaceous. Thorax one-third wider than long, sides broadly rounded from base to beyond middle, then feebly converging and subparallel to apex; disc finely and sparsely punctate. Elytra oval, at base scarcely one-third wider than thorax, humeri rounded, not prominent; sides straight to middle, then broadly rounded to the obtuse apex; striæ fine, deep, indistinctly punctate; intervals flat, finely granulate, without visible setæ, each with two or three rows of the narrow gray scales. Length 2.5 mm. (*W. S. B.*)

Marshall County, Ind., rare; May 28. Larger and more robust than *griseus* with broader thorax and less prominent humeri, and easily separated from both it and *connivens* by the finer and sparser vestiture.

297 (10,914). Smicronyx picipes Dietz, 1894, 140.

Elongate-oval. Pitchy-black; above rather sparsely clothed with brownish and gray intermixed scales; beneath more densely with small oval pale clay-yellow ones; legs piceous. Beak of male shorter than head and thorax, feebly curved, punctured and thinly covered with hair-like scales on basal half; of female longer, shining throughout. Thorax scarcely longer than wide, postocular lobes obsolete, sides rounded, narrowed toward base, apex not constricted, disc densely and confluently punctured. Elytra two-fifths wider at base than thorax, sides nearly straight and parallel to middle; striæ finely and distantly punctate; setæ of intervals scarcely visible. Length 2.5 mm.

Described from one pair in the Ulke collection from Virginia.

298 (10,929). Smicronyx posticus Dietz, 1894, 150.

Oblong-oval. Black, rather densely clothed with moderately large, oval, yellowish and grayish-white scales, mottled above with areas of darker scales; legs reddish-brown. Beak of female as long as head and thorax, rather densely punctured and scaly on basal half. Thorax more than one-half wider than long, sides strongly rounded; disc coarsely and confluently punctured and with an indistinct smooth median line, the intervening spaces forming minute concentric ridges. Length 2.5 mm.

Described from Maryland. Resembles *tychoides* but smaller, the beak less robust, scarcely tapering and the scales evenly distributed on the elytra.

299 (8561). SMICRONYX SQUAMULATUS Lec., 1876, 173.

Oblong-oval. Dark reddish-brown, above very densely clothed with rather large, dark brown scales; elytra with base of third interval and humeri whitish, the disc mottled with numerous small, ill-defined whitish spots; beak, antennæ and legs paler reddish-brown. Beak of male scarcely as long as head and thorax, slender, nearly straight, shining at tip, punctured and pubescent at base; of female, one-third longer, very sparsely clothed with linear scales on basal half. Second joint of funicle two-fifths longer than third. Thorax one-fourth wider than long, sides feebly rounded, disc narrowed in front, its punctures hidden by the scales which are intermixed with numerous inclined brownish setæ. Elytra oblong, one-third wider than thorax, humeri rounded, prominent; sides parallel for two-thirds their length; striæ fine, deep, their punctures concealed; intervals flat, each with a row of fine but distinct suberect brownish setæ. Length 2—2.3 mm. (Fig. 66, *e*.)

Steuben and Lawrence counties, Indiana, scarce; July 29—August 1. Described from Detroit, Mich. Recorded from Woodbury, Atco and Anglesea, N. J.; June—August. Known also from Massachusetts and Pennsylvania. Treated by Casey as a synonym of *corniculatus*, which it closely resembles, but differs in the maculate elytra, paler antennæ and more distinct setæ of both thorax and elytra. Dietz (1894, 177) mentions it as unknown to him but "probably a variety of *corniculatus*." His types show, however, that he had described it (1894, 162) as *S. columbianus*, and also (p. 165) as varieties *b* and *d* of *corniculatus*.

GROUP III.

Our ten species of this group have the elytra much longer than wide, not wider near the middle, the scales distinctly uneven in size, the larger ones forming small spots which are arranged in more or less wavy transverse bands, which are usually most distinct on the median third. The majority of the species belong to Dietz's so-called *cinereus* group, distinguished by having the "tarsal claws very small, not divergent, connate at least to the middle, and the prosternum sulcate in front of the coxæ, the sulcus limited by antecoxal ridges."

KEY TO EASTERN SPECIES OF GROUP III.

a. Elytra more or less reddish, at least toward the sides; the vestiture sparse and uneven in distribution.

b. Thorax distinctly constricted near apex, its punctures round, deep; head dull red; larger scales of elytra yellow. 300. CONGESTUS.

bb. Thorax not or feebly constricted, the punctures reniform or lunate and sides strongly rounded; head black or piceous; larger scales of elytra gray.

c. Punctures of thorax sparse, their intervals polished, not reticulate or with rugæ. 301. TYCHOIDES.

cc. Punctures of thorax dense, often more or less confluent, the intervals forming rugæ.

d. Thorax smaller, without trace of median line. 302. SCULPTICOLLIS.

dd. Disc of thorax with an almost entire median line which is not punctate but finely granulate. 303. SAGITTATUS.

aa. Elytra never distinctly reddish, usually black, sometimes rufopiceous.

e. Legs black or fuscous.

f. Smaller, more slender, not over 2 mm.; sides of thorax feebly rounded. 304. APIONIDES.

ff. Larger, 3 mm.; sides of thorax strongly rounded. 305. ATRATUS.

ee. Legs wholly or in great part reddish.

g. Larger, 3—3.5 mm.

h. Paler spots of elytra formed of larger grayish-white scales; punctures of thorax subconfluent, their intervals forming concentric rugæ. 306. NEBULOSUS.

hh. Scales of pale spots distinctly yellowish; punctures of thorax dense, coarse, not confluent. 307. MACULATUS.

gg. Smaller, less than 2.5 mm.

i. Scales of elytra large, white, sparse, not contiguous, only moderately uneven in distribution; length 1.6 mm. 308. PERPUSILLUS.

ii. Scales of elytra small, clay-yellow, very uneven in distribution; length 2—2.2 mm. 309. INTERRUPTUS.

300 (10,933). SMICRONYX CONGESTUS Casey, 1892, 401.

Rather broadly oval, convex. Reddish-brown, the suture of elytra and abdomen piceous; above sparsely and unevenly clothed with yellowish, scale-like hairs, which form several small spots on thorax and wavy transverse lines on elytra. Beak moderately stout, as long as head and thorax, coarsely punctured and scaly, male; longer, more finely and remotely punctate, female. Thorax slightly wider than long, not much wider at base than apex, sides strongly rounded; disc coarsely, deeply and closely punctate, each puncture bearing a prostrate, scale-like hair. Elytra oval, one-third wider at base than middle of thorax, sides parallel nearly to middle, then regularly curved to apex; striæ fine, deep, distinctly but remotely punctate; intervals with evident setæ. Length 2.2—2.7 mm.

Known from Massachusetts, District of Columbia, Illinois and Colorado. Resembles *sculpticollis* but larger, the thorax larger, more coarsely and sparsely punctate, the second and third funicular joints subequal, each one-half longer than the fourth.

301 (8555). SMICRONYX TYCHOIDES Lec., 1876, 171.

Oblong-oval, robust, convex. Black, sides of elytra in great part dull reddish, the suture black, antennæ and legs, except base of femora, reddish-brown, tarsi fuscous; above sparsely and irregularly clothed with pale gray scales which on the elytra form transverse patches or bands. Beak stout, strongly tapering, as long as head and thorax, male, slightly longer,

female, densely punctured. Thorax slightly wider than long, widest at middle, sides strongly rounded, narrowed in front, not constricted near apex; disc sparsely and rather coarsely granulate-punctate. Elytra at base one-third wider than thorax, humeri prominent, sides parallel to middle, thence rounded to apex; striæ distinct, punctured, intervals flat. Length 2.3—2.7 mm.

Described from Kansas. Recorded from District of Columbia and several localities near New York City, and said to have been bred from galls on dodder, *Cuscuta gronovii* Willd., by Zabriskie. Specimens named *tychoides* in the Leng collection from Long Island proved to be *sculpticollis*, and it is doubtful if the former species occurs east of Kansas and Texas.

302 (10,935). SMICRONYX SCULPTICOLLIS Casey, 1892, 403.

Narrowly oval, convex. Black, feebly shining; elytra reddish-brown, the suture broadly blackish; antennæ piceous, club paler; legs red, darker near coxæ; above sparsely clothed with scale-like hairs which are condensed in spots and transverse lines on the elytra and cover the base of third interval. Beak of male slightly longer than head and thorax, feebly shining, punctate and sparsely scaly on basal half; of female three-fifths as long as elytra, more shining, punctate only near base. Thorax small, slightly wider than long, sides strongly and evenly rounded, not constricted near apex; disc densely and deeply punctured, without median smooth line. Elytra at base one-half wider than thorax, sides parallel and nearly straight in basal half; striæ distinct, obsoletely punctate; intervals flat, rugose. Length 2.1—2.3 mm.

Northern half of Indiana, scarce; June 12—Oct. 4; not taken south of Marion County. Described from Indiana, Virginia and Texas. Known also from New Jersey, Long Island, District of Columbia, Illinois, Kansas and Iowa. The small, densely punctured thorax, narrow hair-like scales and almost wholly dull red elytra distinguish it from its nearest allies. As already noted, LeConte described this species as *corniculatus* Fahr.

303 (10,934). SMICRONYX SAGITTATUS Casey, 1892, 402.

Quite similar to *sculpticollis*. Elytra black, each with a broad, pale, oblique reddish-brown stripe extending from humerus to apex. Thorax larger, its sculpture "fine, dense and peculiar, consisting of long, oblique, uneven eroded channels which are evidently formed by the coalescence of reniform punctures of the *tychoides* type, but also with an even median line entirely impunctate, and finely granulate-reticulate." (*Casey.*) Length 2 mm.

Described from Rhode Island. Not since recorded.

304 (10,936). SMICRONYX APIONIDES Casey, 1892, 405.

Narrowly oblong-oval, convex. Deep black throughout, sparsely and unevenly clothed with scale-like hairs and wider white scales, the latter

condensed on sides of thorax and base of third interval. Beak thick, short, distinctly curved, granulose and punctate; of female, one-half as long as elytra, smoother and more shining. Thorax slightly wider than long, sides broadly and feebly curved, converging and nearly straight near apex; punctures of disc coarse and deep, confluent in threes and fours to form oblique sinuous lines. Elytra at base one-half wider than thorax, three-fifths longer than wide, sides nearly straight and parallel to beyond middle, then rounded to apex; striæ rather fine, deeper near suture; intervals slightly rugose and bearing short, suberect setæ. Length 1.7—2 mm.

Described from North Carolina. Ranges from District of Columbia to Kansas and Texas. Easily known by its small size and the coarse, deep, peculiar sculpture of thorax. LeConte had specimens labelled as *corniculatus* Fahr.

305 (10,932). Smicronyx atratus Dietz, 1894, 153.

Very close to *tychoides*. Differs in characters given in key. Elytra never reddish. Beak regularly curved. Second joint of funicle scarcely longer than third. Thorax more convex, with sides more strongly rounded from base to apex. Length 3 mm.

Known from the District of Columbia and Texas.

306 (10,937). Smicronyx nebulosus Dietz, 1894, 157.

Oval, robust. Piceous, shining, antennæ, legs and apical half of beak reddish-brown; above rather densely clothed with pale yellowish and grayish-white oval scales, mottled with ill-defined areas of a slightly darker shade; beneath more sparsely with smaller dirty gray scales. Beak of male rather stout, as long as thorax, distinctly curved, tapering, glabrous and almost smooth in front of antennæ, sparsely scaly and finely punctate behind; of female one-third longer, more slender, cylindrical, glabrous almost throughout, densely punctured and scaly at base. Second joint of funicle nearly twice as long as third. Thorax wider than long, widest at middle, sides strongly rounded, distinctly constricted near apex, hind angles rounded; disc densely punctate, the punctures shallow, elongate-oval. Base of elytra two-fifths wider than that of thorax, sides parallel to middle then evenly curved to apex, striæ not deeply impressed, their punctures small, remote; intervals with long, inclined, whitish, hair-like setæ, the base of the third with a short white line. Tarsi slender, the fourth joint twice as long as third. Length 3—3.5 mm.

Described from Indiana from specimens in the Horn collection without definite locality; also from District of Columbia and New Jersey. Edgebrook and Bloomington, Ill.; August 27—28. The white scales of elytra in some specimens form conspicuous wavy transverse bands. Either this species or the next, perhaps both, as they are closely allied, was described by Casey (1892, 400) as *flavicans* Lec., the locality being given as Texas, Dakota and Indiana. An examination of the type of *flavicans*

from Texas shows it to have the scales much brighter yellow, more dense and nearly evenly distributed than in either *nebulosus* or *maculatus*. It probably does not occur in our territory.

307 (10,942). SMICRONYX MACULATUS Dietz, 1894, 162.

Oblong, oval, robust. Dark reddish-brown to piceous, above rather densely clothed with small oval pale brown scales, mottled with oblique or subtransverse, irregular bands of larger yellowish ones; legs reddish-brown; beneath clothed with dirty gray scales, those of the sternal side pieces much larger than those of abdomen. Beak of male slender, curved, slightly longer than head and thorax, subopaque, punctured and sparsely scaly in basal half; of female, more slender, one-fourth longer, less punctured and more shining. Second joint of funicle nearly twice as long as third. Thorax one-half wider than long, sides strongly rounded, feebly constricted near apex, disc densely and coarsely punctured. Elytra at base less than one-third wider than thorax, sides nearly straight to behind middle, then gradually curved to apex; striæ deep, finely punctate; intervals flat, their setæ short, indistinct. Hook of hind tibiæ very distinct. Length 3—3.5 mm.

Steuben County, Indiana; June 18. Described from Allegheny Co., Pa., and Dakota. Known also from the District of Columbia.

308 (10,916). SMICRONYX PERPUSILLUS Casey, 1892, 405.

Oblong-oval, convex. Blackish-piceous; above rather sparsely clothed with oval white scales; beneath more densely, with smaller rounded white ones; legs rufous, the tarsi darker. Beak of female distinctly longer than head and thorax, evenly curved, minutely punctulate near apex, punctate and sparsely scaly on basal half. Thorax about as long as wide, sides broadly and evenly curved, the punctures small, shallow and not dense. Elytra at base one-half wider than thorax, one-half longer than wide, sides straight on basal half, then converging to an acutely rounded apex; striæ fine, deep. Length 1.6 mm.

Described from Florida. "Known by its small size and white scales, the latter close-set but generally not quite contiguous." (*Casey.*)

309 (——). SMICRONYX INTERRUPTUS sp. nov.

Oblong-oval. Dark reddish-brown to piceous; above rather densely clothed with small piceous and larger clay-yellow scales, the latter condensed along the sides and median line of thorax and in large irregular wavy blotches across the elytra; beneath with very small gray scales over the entire surface; antennæ and legs reddish-brown, the former piceous in male, base of femora darker. Beak of male piceous scarcely as long as head and thorax, stout, tapering, polished and glabrous near tip; of female, reddish-brown, one-third longer, slender, cylindrical, polished and naked throughout. Funicle stout, second joint one-half longer than third. Thorax as long as wide, widest at middle, sides feebly rounded, not constricted near apex, which is two-thirds as wide as base; postocular lobes

distinct; disc finely, rather densely granulate-punctate. Elytra at base one-third wider than thorax, sides parallel for two-thirds their length, then evenly converging to an obtuse apex; striæ fine, indistinctly punctate; intervals with transverse rugæ without evident setæ. Length 2—2.3 mm. (*W. S. B.*)

Kosciusko, Marion, Vermillion and Posey counties, Indiana; April 18—July 12. Six specimens taken by sweeping and sifting.

Subtribe IV. Hydronomi.

The species of this subtribe live upon semiaquatic plants and the body of fresh specimens is clothed with a dirty brown waterproof coat, formed of scales and a gummy exudation; head not prolonged behind, the eyes contiguous to thorax; funiculus only 6-jointed in a number of genera. Our nine eastern genera are separated as follows:

KEY TO GENERA OF SUBTRIBE IV.

a. Beak very short and broad, not longer than head; tarsi narrow, the third joint deeply emarginate. X. Stenopelmus.

aa. Beak cylindrical, much longer than head.

b. Third joint of tarsi either emarginate or bilobed.

c. Beak curved; funicle 6-jointed, the second joint short; third joint of tarsi broad, deeply bilobed, last joint short.

d. Last joint of tarsi with but one claw. XI. Brachybamus.

dd. Last joint of tarsi with two claws.

e. Last joint of tarsi broad, the claws well separated.

f. Elytra but slightly if any wider than thorax; length usually 2 or more mm. XII. Endalus.

ff. Elytra much wider than thorax; length less than 1.5 mm. XIII. Tanysphyrus.

ee. Last joint of tarsi narrow, projecting beyond the lobes of third, the claws slender. XIV. Onychylis.

cc. Beak straight; second joint of funicle long; last joint of tarsi long.

g. Tibiæ not serrate on the inner side; third joint of tarsi broad, deeply bilobed; funicle 7-jointed. XV. Anchodemus.

gg. Front and middle tibiæ serrate on the inner side; third tarsal joint narrow, slightly emarginate; funicle 6-jointed. XVI. Lixellus.

bb. Third joint of tarsi simple; legs long and slender.

h. Club of antennæ partly smooth and shining; funicle 6-jointed; prosternum not excavated. XVII. Lissorhoptrus.

hh. Club of antennæ entirely pubescent and sensitive; funicle 7-jointed; prosternum broadly and deeply excavated in front of coxæ; thorax feebly constricted near apex. XVIII. Bagous.

X. Stenopelmus Schön., 1836. (Gr., "narrow" + "feet.")

Form very short and broad; antennæ inserted near middle of beak, on the upper surface rather than on the sides; scape long,

reaching the back part of the eyes; funicle 7-jointed, first joint longer and stouter, the others, short, closely united; eyes large, round, coarsely granulated; elytra much wider than thorax; ventral segments 1, 2 and 5 very large; fourth joint of tarsi as long as the two preceding, claws slender, divergent.

310 (8577). STENOPELMUS RUFINASUS Gyll., Schn., 1836, 469.

Short, ovate, convex. Black, densely clothed with a crust of grayish-white scales; apical half of beak, antennæ, tibiæ and tips of femora reddish-brown; tarsi fuscous. Thorax subcylindrical, as wide at base as long, sides almost straight, disc closely punctate, slightly carinate. Elytra twice as wide as thorax, distinctly punctate-striate, intervals almost flat, alutaceous. Under surface with the scales distinct, dense, almost white. Length 1.8 mm.

Lake Co., Ind., July 11. One specimen from the beach of Lake Michigan. Enterprise, Indian River and Bartow, Fla. "Southern and western states to California, where it was found abundantly at San Diego." (*LeConte.*)

XI. BRACHYBAMUS Germ., 1824. (Gr., "short" + "feet.")

Small oblong species, having the first joint of funicle stout, as long as the next three, second narrower, subconic, 3—6 very short, transverse; beak cylindrical, rather stout, as long as head and thorax, densely and finely punctate; eyes round, partly covered by large ocular lobes; scutellum invisible; elytra but slightly wider than middle of thorax. Last joint of tarsi very short and with but one claw, a character occurring in but two other genera of Rhynchophora, (*Mononychus* and *Barilepton*) in our fauna.

311 (8565). BRACHYBAMUS ELECTUS Germ., Schön., 1836, 330.

Elongate-oblong, subcylindrical. Black, densely clothed with a crust of gray and fuscous-brown scales, the brown ones forming a median stripe on thorax, and a broad, common sutural stripe and a humeral spot on elytra; beak, antennæ and legs reddish-brown, club fuscous. Thorax one-third wider than long, sides feebly rounded, disc finely channeled along the middle, distinctly constricted behind the apex, densely, deeply and rather finely punctate, the intervals between the punctures minutely alutaceous. Elytra oblong, their bases conjointly broadly emarginate, sides parallel for four-fifths their length, thence strongly converging to an obtuse apex; intervals subconvex, each with a row of minute white setæ. Length 2.3—2.7 mm.

Lake County, Indiana, frequent on arrow-head (*Sagittaria*); May 28—30. Frequent near New York City, May to August, on palustral plants. Dunedin, Fla., Jan. 24—Dec. 19. Recorded also from Massachusetts, Connecticut and District of Columbia.

Brachybamus inceratus Boh. (1843 Pt. 2, 186), was described as differing from *electus* in having the form more oblong-oval; beak more

strongly curved; thorax more strongly constricted near apex and without median impressed line; elytra truncate at base, the second interval wider and somewhat elevated. The type was a specimen from "America Borealis" in Chevrolat's collection. It is not represented, as far as we can ascertain, in American collections and is probably only a variety of *electus*.

XII. Endalus LaPorte, 1840. (A mythological name.)

In this and the next two genera the beak is elongate, curved, with the antennal grooves starting about one-third from tip and extending directly toward the eyes; first joint of funicle long, the others short, increasing gradually in width; club large, oval; eyes large, oval, coarsely granulate and not approximate beneath; thorax with broad postocular lobes; scutellum minute or invisible; front coxæ large, prominent, contiguous; tibiæ sinuate on the inner side, as long as femora, the front ones finely serrate from the middle to tip. From the other two *Endalus* is separated mainly by the characters given in key.

KEY TO EASTERN SPECIES OF ENDALUS.

a. Elytra distinctly wider than thorax.
  b. Last joint of tarsi, slightly prominent, extending beyond the lobes of the third joint, the claws large.
    c. Length 3.5 or more mm.
      d. Scales with distinct bristles intermixed. 312. SETOSUS.
      dd. Scales nearly uniform gray with very minute bristles; thorax not coarsely punctured. 313. LIMATULUS.
    cc. Length not over 2.5 mm.; thorax coarsely punctured.
      e. Thorax scarcely wider than long; length 2.3 mm. 314. CRIBRICOLLIS.
      ee. Thorax wider than long, constricted in front; length 1.8 mm. 315. PUNCTATUS.
  bb. Last joint of tarsi not prominent, almost concealed between the lobes of the third, the claws small; black mottled with pale gray scales; length 1.8—2 mm. 316. OVALIS.
aa. Thorax as wide at base and wider at middle than elytra; black, the elytra in great part gray; tarsi as in *ovalis*. 317. LATICOLLIS.

312 (8570). Endalus setosus Lec., 1876, 176.

Elongate-oblong. Either uniform dark brown with four narrow lines of pale scales on thorax, or dirty gray with a large common dark brown spot extending from the base of the elytra for four-fifths their length with prolongations on third and fifth ventrals, two clouds on sixth interval and one at humerus; antennæ and legs reddish-brown. Thorax broader than long, strongly rounded on sides in male, less so in female, suddenly narrowed and constricted near apex, deeply, closely not coarsely punctured. Elytra elongate, humeri rounded, sides feebly converging toward the obliquely narrowed tips; striæ fine, intervals feebly convex. Length 3.5—4 mm.

The form with uniform brown elytra was described from Texas; the smaller form, 3.5 mm., with elytral dark blotch, from the "Middle States, Kansas and Texas." No specimens from the Middle States are now in the LeConte collection.

313 (8571). ENDALUS LIMATULUS Gyll., Schön., 1836, 319.

Elongate-oblong. Black, densely clothed with a crust of pale gray and fuscous scales; the latter forming three indistinct stripes on thorax and some scattered oblong spots on the intervals of elytra; antennæ, legs and apical half of beak reddish-brown. Beak strongly curved, as long as head and thorax, its basal half scaly. Thorax one-third wider than long, subparallel on basal half, converging from middle to apex; disc convex, feebly constricted behind the apex, finely, densely and deeply punctate. Elytra at base one-fourth wider than thorax, sides parallel to middle, thence strongly curved to apex; striæ remotely and finely punctate; intervals flat, each with a row of minute setæ. Scales of under surface dense, pale. Length 4.3—5.5 mm.

Lake and Whitley counties, Ind., scarce; May 20—August 7. Occurs at several localities near New York City, May to Sept., principally in or near salt meadows; sometimes taken by sweeping sweet fern. Ranges from New York, Michigan and Colorado south to District of Columbia and Missouri.

314 (8573). ENDALUS CRIBRICOLLIS Lec., 1876, 177.

Oblong. "Blackish brown, the crust formed of grayish scales; disc of elytra with a faint brownish cloud behind the middle. Thorax subquadrate, scarcely wider than long, sides nearly straight, a little rounded near the tip which is constricted; disc very coarsely and deeply punctured. Elytra one-third wider than thorax, humeri rounded. Striæ deep, slightly punctured; intervals nearly flat. Length 2.3 mm." (*LeConte.*)

Described from Georgia. Recorded elsewhere only from District of Columbia.

315 (8574). ENDALUS PUNCTATUS Lec., 1876, 177.

"Smaller and more robust than *cribricollis*, thorax wider than long, more deeply constricted at tip, somewhat less coarsely punctured. Elytra a little wider than thorax, brown with a darker sutural stripe; striæ deep, more distinctly punctured; legs dark testaceous, last tarsal joint and claws still smaller. Length 1.8 mm." (*LeConte.*)

Described from Texas. Recorded from Bellaire, Florida, by Mrs. Slosson and so labelled in the Blanchard collection from Massachusetts. The Florida specimens may be the same as *laticollis*, described below, which differs in having the thorax wider than elytra, both strongly mottled with white.

316 (8575). ENDALUS OVALIS Lec., 1876, 177.

Oval. Black, mottled with pale gray scales; antennæ and legs reddish-brown. Beak scarcely as long as head and thorax, very densely and

roughly punctate. Thorax one-third wider than long, strongly constricted near apex, sides almost straight; disc densely and finely punctate. Elytra one-fourth wider at base than thorax, sides parallel for two-thirds their length, thence converging to an obtuse apex; striæ deep,feebly punctured. Length 1.8—2.2 mm.

Kosciusko, Dubois, Lawrence and Jennings counties, Ind., scarce; May 12—Nov. 20. Sifted from decaying leaves about the roots of trees on the latter date. Doubtless hibernates as imago. Occurs frequently in July and August near New York City on sweet fern or palustral plants and under stones in May. Ranges from Canada and New York to Wisconsin and California.

317 (——). ENDALUS LATICOLLIS sp. nov.

Form of *ovalis* but smaller. Black, densely clothed with white and dark brown scales; the latter forming a large quadrate blotch on basal two-thirds of disc of thorax, covering the declivity of elytra and forming a narrow sutural line on their basal half; antennæ and legs pale reddish-brown. Thorax distinctly wider than in *ovalis*, sides more rounded, feebly constricted, disc less convex and more coarsely punctured, impressed near apex. Length 1.5—1.7 mm. (*W. S. B.*)

Dunedin, Fla., Jan. 26—April 16. Swept from low herbage and taken from beneath boards along the margins of ponds. LeConte, in his description of *ovalis*, doubtless had two species before him, this being the one of which he says: "Several much smaller specimens from California, Florida and Lake Superior, have the thorax comparatively more coarsely punctured, but do not show any other difference. Length 1.5 mm." Schwarz lists *ovalis* as common in Florida, but we do not know to which of the two species he refers. The two when compared can at once be separated by the much wider thorax of *laticollis*. In fresh specimens the difference in color is also marked. The brown, quadrate thoracic spot of *laticollis* often has a small, oblong white spot near its base.

XIII. TANYSPHYRUS Germ., 1824. (Gr., "extended" + "claw.")

Very small species, differing from *Endalus* mainly in having the funicle of antennæ more slender, the joints moniliform; thorax narrower and scarcely rounded on sides; elytra two-thirds wider than thorax, humeri rectangular, prominent. One species, common to both Europe and America, occurs with us.

318 (8576). TANYSPHYRUS LEMNÆ Fab., 1794, 412.

Broadly oval. Blackish-piceous; elytra mottled with gray scales; antennæ and legs reddish-brown; femora in part dusky. Beak more than twice as long as head, finely and densely punctate, its tip depressed.

Thorax subcylindrical, as wide as long, densely and finely rugose-punctate and with an abreviated median carina. Elytral striæ deep, coarsely punctate; intervals convex, minutely punctulate. Length 1.2 mm.

Common throughout northern Indiana; less so in the southern portion. May 21—Oct. 31. Frequent near New York City in May and June on duckweed (*Lemna*) or adhering to boards in water in which the plant is growing. Ranges from New England and Canada to Michigan, south to Florida.. Lake Okeechobee, March 7. Occurs also in Europe, northern Asia and Japan (*Hamilton*). Breeds in ponds and lakes on various species of duckweed, the leaves of which the beetle perforates with round holes. Probably occurs wherever *Lemna* grows.

XIV. ONYCHYLIS Lec., 1876. (Gr., "claw" + "small.")

In this genus the first joint of funiculus is longer and stouter, second short but longer than third, 3—6 gradually a little broader; third joint of tarsus moderately dilated and bilobed, fourth joint narrow, extending beyond the lobes of third. The species resemble those of *Bagous* but differ in having the articular surface of hind tibiæ at apex, not on the sides, and in the smaller and more slender tarsal claws.

KEY TO EASTERN SPECIES OF ONYCHYLIS.

a.	Broadly oval; thorax broader than long.	319. NIGRIROSTRIS.
aa.	Oblong-oval; thorax as long as broad.	320. LONGULUS.

319 (8567). ONYCHYLIS NIGRIROSTRIS Boh., Schön., 1843, Pt. 2, 184.

Black, densely covered with a crust of dirty gray scales; elytra often with a faint broad median fuscous blotch; antennæ and tarsi reddish-brown. Beak of male as long as thorax, black, shining, naked, finely and sparsely punctate; of female covered with scales to insertion of antennæ, beyond that reddish-brown, smooth. Thorax one-fourth wider than long, sides feebly rounded, disc narrowly constricted near apex, finely, densely and deeply punctate. Elytra one-third wider at base than thorax, sides parallel for two-thirds their length, then rapidly converging to the narrowed and compressed apex; striæ rather deep, finely and closely punctate; intervals subconvex without setæ. Length 2.8—3.2 mm.

Northern half of Indiana, common; not taken in the southern portion. Apr. 26—May 25. Occurs frequently near New York City, May—December, on arrowhead (*Sagittaria*). Lake Istokpoga and Dunedin, Fla., Feb. 24—April 16. Swept by hundreds from the flowers and foliage of the pickerel-weed, *Pontederia cordata* L., at Dunedin. Ranges from Canada and New England to Michigan, south to Florida and Texas.

320 (8568). ONYCHYLIS LONGULUS Lec., 1876, 179.

Elongate-oblong. "Black; crust of scales as in *nigrirostris;* antennæ testaceous, club fuscous. Thorax slightly rounded on the sides, feebly constricted near apex, very coarsely punctured. Elytra nearly one-half wider than thorax, humeri oblique, sides parallel for two-thirds their length, then rounded to the tips; striæ well impressed; intervals slightly convex, the alternate ones slightly tessellated. Length 3 mm." (*LeConte.*)

Two in Blanchard collection labelled "Concord River, July 13." Described from Michigan. Not recorded elsewhere. Resembles and easily confounded with *Lissorhoptrus simplex.*

XV. ANCHODEMUS Lec., 1876. (Gr., "narrow" + "body.")

Body narrow, subcylindrical; beak straight, rather stout, cylindrical, as long as thorax, its antennal grooves directed toward, and scape reaching the eyes; first and second joints of funicle elongate, 3—7 gradually wider, club oblong-oval, wholly pubescent; thorax with large ocular lobes; prosternum broad, deeply emarginate in front, not sulcate; legs long and slender, last joint of tarsi as long as second and third united, with large, divergent claws.

KEY TO EASTERN SPECIES OF ANCHODEMUS.

a. Length 4—4.5 mm.; second joint of funicle scarcely longer than first.
b. Elytra brownish-gray or blackish, without a paler band. 321. ANGUSTUS.
bb. Elytra brown, with a broad, angulated paler band behind the middle. 322. SCHWARZI.
aa. Length 7.5 mm.; second joint of funicle twice as long as first. 323. HUBBARDI.

321 (8578). ANCHODEMUS ANGUSTUS Lec., 1876, 181.

Elongate, slender. Black or piceous, densely clothed with a crust of gray or blackish scales; antennæ and legs pale reddish-brown; club fuscous. Beak slender, finely and sparsely punctate, its tip polished. Thorax slightly longer than wide, sides parallel, base rounded; disc feebly constricted near apex; sculpture hidden by scales. Elytra one-third wider and three times as long as thorax, humeri oblique; sides parallel for three-fourths their length, then strongly converging to a subacute apex; striæ with fine, close-set punctures; intervals flat, each with a row of minute, inclined, pale bristles. Length 4 mm.

Kosciusko and Vigo counties, Ind., scarce; May 21—June 25. Swept from sedges about the margins of ponds and lakes. Occurs in New Jersey in marshes throughout the State. Ranges from Canada and New England to Michigan and Illinois, south to Florida. Recorded as eating the leaves of arrow-head. (*Sagittaria.*)

322 (8580). ANCHODEMUS SCHWARZI Lec., 1876, 182.

Elongate, subcylindrical. Brown, the crust of brown scales; thorax with three paler stripes; pale band of elytra with the angle at the suture directed forward; antennæ and legs brownish-yellow. Beak stouter than in the other two species, densely punctured, slightly pubescent. Thorax slightly longer than wide, not constricted in front, sides feebly rounded. Elytra more than one-third wider than thorax; striæ finely punctate; tips conjointly rounded. Length 4.5 mm.

Described from Detroit, Mich. Easily known by the stouter beak and conspicuous pale band of elytra.

323 (8579). ANCHODEMUS HUBBARDI Lec., 1876, 181.

Elongate, narrow. Dark reddish-brown covered with a dense crust of grayish-white scales, those of sides of thorax, margins of elytra and under surface very small, rounded and yellowish in hue; beak, antennæ and legs pale reddish-brown. Beak as long as thorax, nearly straight, naked, shining, finely punctate, carinate and pubescent near base. Thorax not longer than wide, distinctly constricted near tip, slightly rounded on the sides. Elytra one-fourth wider than thorax, humeri rounded, tips separately acuminate and rounded; striæ hidden by scales, shallow and punctured. Length 7.5 mm. (*LeConte.*)

Described from Detroit, Michigan, where it appears to be common in June. Known elsewhere only from Stoneham, Mass.

XVI. LIXELLUS Lec., 1876. (Gr., Lixus + "little.")

Long, slender, much narrower than *Anchodemus;* beak shorter than thorax, rather stout, nearly straight; joints 1 and 2 of funicle elongate, 3–6 short, slightly wider; club elongate-oval, acute; fourth tarsal joint as long as the three preceding united; claws large, divergent. One species is known.

324 (8581). LIXELLUS FILIFORMIS Lec., 1876, 182.

Very elongate, subcylindrical. Black, covered with very small brown scales; elytra mottled with paler; antennæ and legs reddish-brown. Beak opaque, punctulate, scaly. Thorax slightly longer than wide, feebly constricted near apex, sides nearly straight, disc very densely punctulate. Elytra not wider than middle of thorax, nearly four times as long as wide, tips conjointly rounded; striæ punctured, intervals flat. Length 4.3—4.8 mm.

Quebec, Canada, June. Described from Canada and Oregon; known also from Colorado and Nevada. Resembles a small, slender *Lixus,* whence the generic name. Said by Schwarz to be aquatic in habit.

XVII. LISSORHOPTRUS Lec., 1876. (Gr., "smooth" + "club.")

Club of antennæ smooth, shining, pubescent only near tip; first joint of funicle stout, rounded, second as long as the next

two, 3—6 gradually wider; tibiæ rather stout, somewhat curved, armed with a strong terminal hook; tarsi narrow, third joint neither emarginate nor bilobed, fourth as long as the two preceding, the claws slender, approximate.

325 (8582). LISSORHOPTRUS SIMPLEX Say, 1831, 29; ibid, I, 297.

Oblong-oval. Black, densely clothed with a coating of large, olive-gray scales; elytra of female often with a large, indistinct fuscous area; antennæ and tarsi reddish-brown. Beak stout, as long as thorax, subcylindrical, densely rugosely punctate. Thorax as long as wide, slightly constricted near apex, sides feebly rounded; disc with a faint, finely impressed median line, densely rugosely punctate; sides at middle with a shallow, transverse impression. Elytra at base one-third wider than thorax, humeri oblique; sides very feebly converging for two-thirds their length, then strongly so to the narrowed apex; strial punctures rather small, close-set, intervals each with one or more small tubercles near the apical declivity. Length 2.8—3.2 mm. (Fig. 68.)

Fig. 68. Beetle × 10; *h*, antenna showing glabrous basal portion of club. (After Tucker.)

Lake, Kosciusko, Wells and Dubois counties, Ind.; probably throughout the State; May 9—July 10. Swept from grasses and sedges near lakes and ponds. Hudson Co., Hoboken salt meadows and Irvington, N. J. Dunedin, Fla., March 14. Ranges from Canada and New England to Michigan and Iowa, south to Florida and Texas.

Known as the "rice water-weevil," and doing more damage to rice crops in the southern states than any other insect. Tucker (1912) states that the larva, known as the "rice-root maggot," devours the roots while the adults feed on the foliage of the young and tender plants. Water is the element in which the beetle delights, and it breeds only in plants growing in it. It swims readily on or beneath the surface, and feeds, rests and mates almost as frequently in the water as above it. Two specimens were kept by C. E. Hood 96 hours under water before dying. The adults hibernate, principally in Spanish moss, the eggs being laid in early spring and the beetles maturing in July. The most practical method of control is the drainage of infested rice fields and allowing them to dry suffiently to kill the larvæ before the latter have greatly weakened the plants. Besides cultivated rice, *L. simplex* feeds also on wild rice, arrow-head, bulrushes and water-lilies.

326 (8583). LISSORHOPTRUS APICULATUS Gyll., Schn., 1836, 320.

Differs from *simplex* in having the antennal club fuscous, beak more slender, as long as head and thorax, less densely scaly. Thorax slightly

wider than long, without a transverse impression at middle of sides. Elytra but slightly wider at base than thorax, intervals flat, finely alutaceous. Length 3.5 mm.

Near New York City at Jamesburg, New Jersey, April 18; Camden and Gloucester Co., N. J., in swamps. Described from Missouri. "Occurs in the Southern States and Texas." (*LeConte.*) The differences between the two species, as given above, are those mentioned by Gyllenhall, but they are not visible in specimens labelled *apiculatus* in the LeConte collection.

XVIII. Bagous Schön., 1826. (A Persian proper name.)

Beak shorter than head and thorax, subcylindrical, moderately curved, its antennal grooves deep, reaching the eyes; joints 1 and 2 of funicle longer than the others, obconical, the first the stouter; 3—7 short, crowded, gradually wider; club oval, larger than usual; thorax subcylindrical, slightly narrowed in front, constricted near apex, the postocular lobes large; elytra oblong-ovate, strongly narrowed toward apex, disc more or less depressed, strongly declivous on apical third, and usually with a distinct callus or oblong tubercle on or near the declivity; tibiæ slender, strongly curved, armed at tip with a strong claw, the articular surface on the side; tarsi narrow, not spongy beneath, the claws divergent. The North American species have not been treated since LeConte reviewed them in 1876, when he described as new 12 of the 13 which stand in our lists. A number of others have since come to light, mainly through the collecting of the late Frederick Blanchard of Tyngsboro, Mass., who took especial delight in searching for these and other aquatic forms, and by the collecting of the senior author in Florida. Seven of these from our territory are herewith described for the first time, and doubtless a number of others as yet unnamed occur in collections. They are found under cover or on plants in or near water.

KEY TO GROUPS OF EASTERN SPECIES OF BAGOUS.

a. Elytra with one or two white or grayish spots on or near the upper edge of the apical declivity. Group I.

aa. Elytra without white spots near the declivity, though sometimes with oblique pale bands on sides. Group II.

Group I.

In this group the third, and sometimes the fifth, elytral interval is usually slightly more convex at apical third, forming a more or less evident oblong callus, but this never distinctly tu-

berculate as in *mammillatus*. On or between these raised places the surface is white or grayish-white. If the callus is not present the white spot occurs in the place where it should be.

KEY TO SPECIES OF GROUP I.

a. Disc of thorax very uneven, with numerous short ridges and depressions.
b. Front foveate; alternate elytral intervals mottled with short oblong darker spots; larger, 4.7—5 mm. 327. MAGISTER.
bb. Front excavated; elytra uniform sooty black without darker spots; smaller, 4—4.3 mm. 328. CAVIFRONS.
aa. Disc of thorax without ridges and depressions, usually covered with small granules.
c. Larger, 3—4 mm.; form robust.
d. Elytra mottled with small pale spots or dots; thorax very coarsely granulate; front not foveate; length 4 mm. 329. MACULATUS.
dd. Elytra not mottled with pale spots; thorax finely granulate; front foveate; length not over 3.5 mm.
e. Sides of thorax and elytra clay-yellow, elytra with an oblique stripe of clay-yellow scales extending from middle of sides to white bar at declivity. 330. LUNATUS.
ee. Surface uniform black except the white cross-bar near declivity. 331. ATRATUS.
cc. Smaller, not over 2.5 mm.; form more slender; beak shorter than thorax.
f. White spot at apex of declivity single, crossing the suture in the form of a small cross-bar; form very slender. 332. PURITANUS.
ff. White spots two, one on each elytron; form ovate. 333. RESTRICTUS.

327 (8590). BAGOUS MAGISTER Lec., 1876, 186.

Elongate-oblong, robust. Blackish-brown, the elytra mottled with fuscous and pale brown scales, and with a transverse spot of pale scales crossing the suture just behind the middle, this sometimes interrupted at suture; antennæ, tibiæ and tarsi dark reddish-brown. Beak as long as thorax, feebly tricarinate, rather stout, slightly curved; front with an elongate fovea between the eyes. Thorax distinctly longer than wide, broadly constricted near apex, sides sinuate, disc with deep channel at middle, very uneven as mentioned in key. Elytra nearly one-half wider than thorax, humeri rounded, sides parallel for three-fourths their length; striæ rather finely and closely punctate; intervals subconvex, the second, fourth and sixth elevated, the fourth ending in an obtuse tubercle on the declivity. Length 4.7—5 mm.

Lake, Starke and Marshall counties, Indiana, scarce; May 3—Oct. 3. Various localities in New Jersey on water lilies in May and June. Ranges from New Jersey and Canada to Michigan, south to Texas. Our largest and most robust species.

328 (8589). BAGOUS CAVIFRONS Lec., 1876, 186.

Oblong-oval, robust, subdepressed. Black, covered with fuscous-black scales; elytra each with a small, oblique spot of white scales at apical

third extending from second to fifth striæ; antennæ and legs nearly black. Beak shorter than thorax, rather stout, nearly straight, flattened and finely tricarinate above. Thorax longer than wide, gradually slightly narrowed in front, sides nearly straight, constricted near apex; disc uneven, with short deep grooves and ridges and a broad shallow dorsal channel interrupted at middle. Elytra nearly one-half wider than thorax, humeri oblique, sides feebly converging behind the base; intervals broad, feebly convex, each with a row of very short whitish bristles. Length 4—4.3 mm.

Dunedin, Fla., Jan. 9—April 4. Described from Enterprise, Fla. Recorded from Irvington, New Jersey, July 12.

329 (——). BAGOUS MACULATUS sp. nov.

Oblong-oval, robust. Black, densely clothed with clay-yellow and slate-gray scales, the pale ones forming a median stripe on head and beak, a broad stripe each side of thorax and numerous small spots and dots over the elytra; the white spot on third interval near declivity small, round, subconical; funicle of antennæ, tarsi and apical third of tibiæ dark red. Beak three-fourths the length of thorax, rather stout, curved, densely scaly. Thorax subcylindrical, as long as wide, sides nearly straight, strongly constricted near apex; disc coarsely and densely granulate and with a shallow median groove. Elytra behind the humeri one-half wider than thorax, humeri oblique, prominent, subangulate, sides feebly converging from behind the humeri to declivity, then strongly so to apex; striæ fine, intervals slightly convex, the fifth with a small white tubercle on declivity. Tibiæ stout, strongly curved near apex, and with a long stout hook; tarsi short, the third joint not broader nor emarginate. Length 4 mm. (*W. S. B.*)

Dunedin, Fla.; Feb. 14—March 24; two specimens from beneath boards near ponds. The large size, distinctly maculate elytra and tibiæ red only near apex, separate this from all others.

330 (——). BAGOUS LUNATUS sp. nov.

Oblong-oval, robust. Black, densely clothed with clay-yellow and fuscous-brown ocellate scales, the former covering the head and beak and forming a broad stripe along each side of thorax and elytra; this stripe with an oblique spur extending from basal third of elytra to a broad, lunate white spot, concave behind, which crosses the suture at apical third; antennæ, except the club, tibiæ and tarsi reddish-brown. Beak shorter than thorax, rather slender; front with an oblong fovea. Thorax as long as wide, sides almost straight, feebly constricted near apex; disc with a faint median channel, covered with rather coarse granules. Elytra behind the humeri one-half wider than thorax, humeri oblique; sides feebly converging for three-fourths their length, then strongly so to the compressed and subacute apex; third, fifth and seventh intervals more convex, the third more so at apical fourth, the fifth with a small conical tubercle on declivity. Length 3.4 mm. (*W. S. B.*)

Ft. Myers, Dunedin and Lake Okeechobee, Fla., scarce; March 1—22. The arrangement of the pale and dark scales on elytra taken with the oblique humeri separate this from all other species.

331 (——). Bagous atratus sp. nov.

Oblong, robust. Black, densely clothed with dull black scales; elytra with a grayish-white cross-bar crossing the suture between the third intervals at upper edge of declivity; antennæ, except the club, and legs dull red; under surface with dirty gray ocellate scales. Beak stout, shorter than thorax, finely carinate; front with a small fovea. Thorax one-third wider than long, strongly constricted near apex, sides broadly rounded, disc finely granulate and with a distinct median channel. Elytra broad, depressed; at base one-third wider than thorax; humeri rounded, sides straight to apical fifth then strongly converging and compressed to apex; intervals convex, the third distinctly more so, all with a row of short inclined yellowish setæ, more evident on the sides and declivity. Length 3 mm. (*W. S. B.*)

Vigo County, Indiana, May 15. Resembles *mammillatus* but with only a small single tubercle on declivity, thorax wider than long, beak more slender, scaly, third tarsal joint not broader nor emarginate.

332 (——). Bagous puritanus sp. nov.

Elongate, slender, subcylindrical. Black, densely clothed with dark gray scales; a stripe each side of thorax, a spot on humeri and a narrow crossbar between the third intervals of elytra at declivity of whitish ones; antennæ, except club, tip of beak, tibiæ and tarsi pale reddish-brown. Beak much shorter than thorax, slender, curved; front not foveate. Thorax as wide as long, sides feebly curved, constricted near apex; disc densely and finely granulate. Elytra one-third wider at base than thorax, sides straight to the declivity, then strongly converging to apex; third interval slightly more convex than the others, tubercle of the fifth very faint. Length 2.5 mm. (*W. S. B.*)

Taken by Blanchard at Dracut, Massachusetts. Type in the Cambridge Museum.

333 (8593). Bagous restrictus Lec., 1876, 187.

Oblong-oval. Black, covered with dirt-colored scales; elytra each with a small transverse white spot on second and third intervals at about two-thirds the length; antennæ, tibiæ and tarsi reddish-brown. Beak nearly as long as thorax, subcarinate. Thorax as wide as long, slightly wider from the base forwards; sides straight for three-fourths their length, then rounded and suddenly constricted, more strongly than in most other species; disc coarsely granulate. Elytra oval, humeri oblique, obtusely angulated; sides converging to the declivity; apex very narrow; striæ deep; intervals convex, the fifth ending in a small conical tubercle covered with white scales. Length 2.5 mm.

Ithaca, New York, May 5. Described from Texas. Recorded from Ohio and Iowa.

Group II.

In this group the elytra is without a white or gray spot near upper edge of declivity, though in several species there are

straight or oblique pale stripes on the sides. The species are smaller, *americanus* being the only one over 3.5 mm. in length.

KEY TO EASTERN SPECIES OF GROUP II.

a. Surface everywhere clothed with fine ocellate silvery-gray scales; thorax not granulate; tarsi very long, slender.
b. Femora red, strongly clavate; larger, 3.5—4 mm. 334. AMERICANUS.
bb. Femora black, feebly clavate; length 2.8—3 mm. 335. BLANCHARDI.
aa. Surface without scales as above; thorax granulate; tarsi shorter and stouter.
c. Elytra each with two tubercles on or near the declivity; color black or fuscous; length 2.4—3 mm. 336. MAMMILLATUS.
cc. Elytra each with one tubercle on the declivity.
d. Elytra with a broad black band crossing the suture behind the middle; length 1.8 mm. 337. PUSILLUS.
dd. Elytra without post-median black band.
e. Elytra with alternate intervals distinctly more elevated, the sides and apex gray, disc with a large common triangular black spot. 338. SELLATUS.
ee. Elytra with intervals flat or subequal in convexity.
f. Third joint of tarsi broader than second and emarginate.
g. Scales of upper surface uniform pale gray; length 3 mm. 339. PLANATUS.
gg. Scales gray and dark brown; elytra each with an oblique pale stripe; length 2.3 mm. 340. OBLIQUUS.
ff. Third joint of tarsi narrow, not wider than second, not emarginate.
h. Thorax wider than long; beak as long as thorax.
i. Elytra mottled with pale and darker scales; thorax feebly constricted in front; length 3.2 mm. 341. NEBULOSUS.
ii. Elytra uniformly clothed with blackish-gray or clay-yellow scales; thorax one-half wider than long, strongly constricted near apex; length 2.3—2.5 mm.
j. Front with a large fovea; sides of thorax sinuate; antennæ and legs nearly black. 342. TRANSVERSUS.
jj. Front without fovea; sides of thorax not sinuate; antennæ and legs red. 343. OCHRACEUS.
hh. Thorax not wider than long; beak shorter than thorax.
k. Larger, 3 mm.; elytra black, usually covered with dirt-colored scales, their striæ very deep. 344. BITUBEROSUS.
kk. Smaller, 2 mm.; elytra with an oblique clay-yellow stripe reaching from humerus to the prominent tubercle of declivity; striæ fine. 345 PAUXILLUS.

334 (8588). BAGOUS AMERICANUS Lec., 1876, 185.

Elongate-oblong. Black or brown, uniformly covered with a crust of minute round ocellate silver-gray scales; antennæ and legs pale reddish-brown. Beak of male stout, shining, as long as thorax, very finely punctate; of female more slender, one-third longer, the antennæ inserted about

its middle. Thorax longer than wide, sides parallel on basal third, rounded on middle third, broadly constricted near the tip, its sculpture hidden by scales. Elytra at base one-third wider than thorax, humeral angles obtuse, sides parallel for three-fourths their length, then converging to the subacute tips; striæ fine, distinctly punctured; intervals flat, the fourth with a small obtuse tubercle on the declivity. Length 3.5—4 mm.

Laporte, Marshall, Kosciusko and Vigo counties, Ind., scarce; June 12—Oct. 26. Near New York City at Collingswood and Beesley's Point, N. J., June 30—July 27. Ranges from Quebec and New England to Michigan and Florida. This and the next are very distinct by the elongate form, small, silver-gray ocellate scales and very smooth, sericeous upper surface.

335 (——). Bagous blanchardi sp. nov.

Much smaller and more slender than *americanus*. Vestiture as there, the entire surface very even, smooth and clothed with silvery gray ocellate scales; antennæ, except club, tibiæ and tarsi pale reddish-brown; femora black, reddish at base. Beak shorter than thorax, slender, cylindrical, almost straight, front with a small shallow fovea. Thorax subcylindrical, as long as wide; disc broadly feebly constricted near apex. Elytra as in *americanus*, intervals all flat, the fifth with a small tubercle on declivity. Femora much more slender; tarsi more than half the length of tibiæ, the third joint not broader nor emarginate. Length 2.8—3 mm. (*W. S. B.*)

Tyngsboro and Dracut, Massachusetts; Sept. 20—Nov. 10. Collected by Blanchard; set aside and labelled "n. sp." in his collection.

336 (8584). Bagous mammillatus Say, 1831, 28; ibid, I, 297.

Oblong. Black, densely clothed with fuscous scales, sides of thorax indistinctly paler; elytra often with scattered small pale spots on the sides; antennæ, tibiæ and tarsi reddish-brown, club fuscous. Beak stout, glabrous, shorter than thorax, finely and sparsely punctate; front with a large fovea. Thorax as long as wide, sides behind the apical constriction almost straight; disc with a broad but shallow median impressed line, the sculpture hidden by the coat of scales. Elytra at base one-half wider than thorax, humeri rounded, prominent; striæ hidden, intervals flat on the disc, convex on the sides, the second with a distinct tubercle behind the middle, the fourth with another on the declivity. Length 2.5—3 mm.

Starke County, Indiana, rare; May 22. Recorded definitely from Quebec, Ohio, Michigan, District of Columbia and Missouri.

337 (8594). Bagous pusillus Lec., 1876, 187.

"Elongate, rather slender. Black, clothed with dirt-colored scales; elytra with a broad, toothed, transverse black band behind the middle; antennæ and legs brown. Beak as long as thorax, stout, curved, scaly. Thorax about as wide as long, sides straight, suddenly rounded, narrowed and strongly constricted near tip; elytra nearly one-half wider than

thorax, humeri prominent, oblique and rounded, sides nearly parallel, tips rather broadly rounded; striæ fine, intervals flat, the fourth with a small, prominent tubercle. Length 1.8 mm." (*LeConte.*)

Described from Capron, Florida.

338 (8585). BAGOUS SELLATUS Lec., 1876, 184.

Oblong. Black; head and three stripes on thorax pale gray; sides and tips of elytra ash-gray, leaving a large, elongate common triangular space black; antennæ, tarsi and tibiæ reddish-brown. Thorax subquadrate, as long as wide, sides parallel, disc strongly constricted near apex, rather coarsely granulate, without impressed line. Elytra one-third wider at base than thorax, humeri oblique, sides feebly divergent from base; striæ rather deep, intervals convex, the first, third and fifth more elevated, the fifth ending in a large conical tubercle. Length 2.5 mm.

Described from Georgia. Recorded from Cincinnati, Ohio, and Fort Monroe, Va.

339 (8586). BAGOUS PLANATUS Lec., 1876, 185.

"Black, uniformly and densely clothed with dark ash-gray scales; antennæ and feet dark brownish-yellow. Beak nearly as long as thorax, punctured, nearly naked, stout, curved. Thorax slightly longer than wide, sides parallel, suddenly constricted near apex; disc coarsely granulate, feebly channeled. Elytra wider than thorax, humeri less oblique, prominent; striæ fine, intervals very flat; fifth with a conical tubercle on the declivity; third with a distinct but flat elevation at about two-thirds the length. Length 3 mm." (*LeConte.*)

Described from Lake Superior and New York. "Related to *mammillatus* but the striæ of elytra finer, intervals more flat, the front tubercle hardly apparent and the scales purer gray." (*LeConte.*)

340 (8587). BAGOUS OBLIQUUS Lec., 1876, 185.

Elongate-oblong. Black, densely clothed with dark brown and ash-gray scales, the latter forming a broad stripe each side of thorax, and an indistinct oblique pale band, beginning at humerus and reaching suture behind the middle of elytra; also some spots on third and fourth intervals; antennæ and legs dark reddish-brown. Beak as long as thorax, stout, curved, flattened above; front with a short, impressed line. Thorax as long as wide, sides nearly straight, slightly wider in front of middle, broadly constricted behind apex, coarsely granulate. Elytra nearly one-half wider than thorax, humeri rounded; apex oblique, narrowly rounded; striæ deep, intervals slightly convex, the fourth with a distinct tubercle on the declivity. Length 2.3—2.5 mm.

Hudson County and Arlington, N. J., March 12—17. Fulton County, N. Y. Ranges from Quebec and New England to Michigan and Iowa, south to Florida. A small oblong species easily known by the oblique pale band of elytra.

341 (8591). Bagous nebulosus Lec., 1876, 186.

Oblong, rather robust. Black, clothed with dirty gray scales, variegated with darker and pale ones; elytral markings indistinct, the most conspicuous being a pale stripe extending on the fifth and sixth intervals from the oblique impression to behind the middle, where it is bent at right angles and runs to the suture; antennæ and legs dark reddish-brown. Beak slender, curved, as long as thorax, finely punctulate, naked except at base. Thorax one-half wider than long, coarsely granulate, sides feebly diverging from base to beyond middle, then rounded and converging to the constricted apex; disc finely granulated. Elytra oblong, one-third wider than thorax, disc impressed obliquely at basal third; humeri prominent, rounded; intervals slightly convex, each with a row of short white inclined bristles. Length 3—3.2 mm.

Lowell, Mass.; Blanchard collection. Described from Port Huron, Michigan.

342 (8596). Bagous transversus Lec., 1876, 188.

Oblong-oval, less convex. Black, covered with blackish-gray scales; antennæ and legs nearly black. Beak stout, curved, as long as thorax, naked, punctulate, subcarinate near base; frontal fovea large. Thorax very finely granulate, sides sinuate. Elytra uneven, marked with vague impressions, one-half wider than thorax; posterior callus large, obtuse, striæ fine, intervals feebly convex. Length 2.3 mm.

Known from Detroit, Mich., and District of Columbia.

343 (——). Bagous ochraceus sp. nov.

Short, oval, robust. Piceous, everywhere densely clothed with a crust of dirty yellow scales; antennæ and legs dark red. Beak rather slender, curved, as long as thorax, densely scaly, finely and densely punctate. Thorax one-third wider than long, sides broadly rounded, strongly constricted near apex. Elytra oval, one-fourth wider at base than thorax, humeri rounded, sides evenly converging to declivity, then more strongly so to apex; striæ deep, intervals convex, each with a row of fine whitish recurved setæ; the tubercle on declivity scarcely evident. Tibiæ and tarsi short, stout. Length 2.3—2.5 mm. (*W. S. B.*)

Dubois County, Indiana; May 11—26. Six specimens beaten from oak and taken on the wing. The dirty yellow coating is thicker and more dense than in any other species.

344 (8595). Bagous bituberosus Lec., 1876, 188.

Oblong-oval, robust. Black, usually covered with dirt-colored scales; antennæ, tibiæ and tarsi dark reddish-brown. Beak stout, shorter than thorax, finely carinate, densely punctate. Thorax as wide as long, sides straight to apical third, then suddenly rounded and strongly constricted near apex; disc feebly channeled on basal half, finely and densely granulate. Elytra one-third wider than thorax, striæ deep, coarsely punctate

at bottom; intervals convex, fifth ending in a large tubercle on the declivity, third slightly wider and more convex than the others. Length 3—3.5 mm.

Dunedin, Florida; Feb. 24—April 6. Taken beneath boards along the margins of ponds. Fort Capron, Enterprise and Tampa, Florida; very rare (*Schwarz*). Recorded also from District of Columbia, Michigan, Iowa and Kansas.

345 (——). BAGOUS PAUXILLUS sp. nov.

Oblong-oval. Piceous-black; above clothed with clay-yellow and dark brown scales, the paler ones covering the head, most of the thorax and forming a broad, uneven stripe along each side of elytra, these merging across the declivity; four small spots across base of thorax and a large triangular discal one on elytra dark brown; under surface of body and apical halves of femora sooty brown; antennæ and remainder of legs reddish. Beak one-half as long as thorax, stout, naked and finely punctate near apex; front with an elongate fovea. Thorax subcylindrical, as long as wide, sides straight, feebly constricted near apex, disc finely and densely granulate-punctate. Elytra broadly oval, one-third broader at base than thorax, humeri rounded, sides straight to declivity: intervals feebly convex, minutely setose, the fifth with a prominent tubercle on declivity. Length 2 mm. (*W. S. B.*)

Guilford, Connecticut, August 22. Several specimens in Blanchard collection labelled Massachusetts. Notable for the color arrangements of its scales, small size, short beak and large elytral tubercle.

Tribe VIII. TYCHIINI.

Oblong or oblong-oval, convex, rather robust species, thickly clothed with pale pubescence, sometimes interrupted by brown or yellow spots or bands; beak usually long and slender, the antennæ inserted far behind its tip; scape not passing front border of eyes, funicle 6- or 7-jointed, club wholly pubescent; thorax without ocular lobes; ventral segments less unequal in length than in Erirhinini, strongly prolonged backward at the sides, the prolongations of the second segment sometimes reaching the fourth, covering entirely the edges of the third (Fig. 22, d); tibiæ with a spine at tip; tarsal claws usually either appendiculate or toothed. Synopses of *Tychius* and *Thysanocnemis* are given by

Casey, T. L.—"Coleopterological Notices, IV—Tychiini" *in* Ann. N. Y. Acad. Sci., VI, 1892, 411—426.

KEY TO EASTERN GENERA OF TYCHIINI.

a. Angles of second ventral segment not extending to the fourth.

b. Claws appendiculate, i. e., armed at base with a short broad tooth; form elongate-oblong; length less than 4 mm. I. PROCTORUS.

bb. Claws toothed or simple; form more oval.

c. Fourth ventral suture indistinct; beak very slender, not carinate; pubescence coarse. II. THYSANOCNEMIS.

cc. Fourth ventral suture distinct; beak carinate.

d. Thorax not constricted near apex; beak stout; elytra dark brown, with a single pale cross-band behind middle. III. PLOCETES.

dd. Thorax distinctly constricted behind apex; beak slender; elytra with a black cross-band at middle, bordered both before and behind with an irregular band of yellowish-white scales. IV. CHIONANTHOBIUS.

aa. Angles of second ventral segment extending to the fourth.

e. Elytra with tubercles of tufted hairs. V. TYLOPTERUS.

ee. Elytra not tuberculate.

f. Tips of elytra conjointly rounded, covering the pygidium. VI. TYCHIUS.

ff. Tips of elytra separately rounded; claws simple. VII. PARAGOGES.

I. PROCTORUS Lec., 1876. (Gr., "anus.")

Small oblong species resembling *Dorytomus* in general appearance and having the beak as long or longer than thorax, cylindrical, curved, punctured; antennæ inserted at its apical third, scape slender, reaching the eyes, funicle 7-jointed, the first joint as long as the next two, 2—7 nearly equal, short, gradually wider; eyes rounded, widely separated; ventral segments unequal, third and fourth together not longer than second. *Encalus* Lec. is now included with *Proctorus*.

KEY TO SPECIES OF PROCTORUS.

a. Femora not toothed; beak as long as thorax, rather stout, densely punctured, not striate. 346. ARMATUS.

aa. Femora minutely toothed; beak longer than thorax, much more slender, striate and punctured on basal half. 347. DECIPIENS.

346 (8687). PROCTORUS ARMATUS Lec., 1876, 212.

Elongate-oblong. Black or piceous, thinly clothed with white and dull yellow hairs, the former condensed to form a short humeral stripe and some small scattered spots on elytra; antennæ, tibiæ and tarsi reddish-brown. Thorax as wide as long, sides broadly rounded, feebly impressed near tip, disc rather finely and densely punctured. Elytra elongate-oblong, one-third wider at base than middle of thorax, humeri prominent, rounded, sides parallel to apical fourth; striæ with large, deep close-set punctures; intervals flat, sparsely and finely punctate. Length 3.4—3.8 mm.

Marquette, Mich., June 28. South side of Lake Superior. Of the male LeConte says: The fifth ventral is as long as the three preceding united and is divided by a transverse elevated ridge into two parts, the front one being the larger and broadly con-

cave, the hind one much more deeply concave. On each side, at the junction of the transverse ridge and margin, is a stout flattened horn and on the middle of front margin of the segment is a third shorter horn.

347 (8688). PROCTORUS DECIPIENS Lec., 1876, 213.

Elongate-oblong. Dark reddish-brown to piceous, clothed with white and yellowish scale-like hairs, the latter forming a narrow sutural stripe; elytra reddish-brown, with a broad transverse blackish band just behind the middle; antennæ and legs pale reddish-brown. Thorax not wider than long, sides broadly rounded from base to beyond middle, then strongly converging to apex, disc coarsely and very deeply punctured. Elytra as in *armatus*; striæ coarsely punctured, intervals flat. Length 3—3.4 mm.

Ranges from Quebec and New England to Illinois, Northern Michigan, Minnesota and Colorado. In form and color resembles *Hypcrodes solutus* Boh. but widely different in structural characters. Occurs on willow.

II. THYSANOCNEMIS Lec., 1876. (Gr., "fringe" + "leg.")

Beak cylindrical, curved, as long as thorax and punctured near base, male; usually longer, much more slender, almost smooth, shining, female; antennæ inserted at apical third or fourth, male, at or behind the middle, female; scape slender, reaching the eyes, which are large, rounded, prominent and coarsely granulated; funicle 7-jointed, first joint long and stout, second slightly longer than third, 3—7 nearly equal; ventral segments unequal, first and second equal, third and fourth together usually but slightly longer than second, fifth longer than third and fourth united; pygidium perpendicular, partly exposed; femora unarmed; claws with a long tooth which curves inwards.

KEY TO EASTERN SPECIES OF THYSANOCNEMIS.

a. Elytral intervals subequal in width and prominence.
  b. Elytra with a broad darker band at middle.
    c. Pubescence long, very coarse; intervals of elytra each with a single row of much longer lanceolate, subprostrate yellowish or blackish scales; beak of female stout, as long as thorax; front tibiæ of male densely fringed with long hairs. 348. FRAXINI.
    cc. Pubescence much shorter and finer; intervals each with a row of broad, distant, suberect white scales; beak of female much more slender, as long as head and thorax; front tibiæ of male without a fringe of hairs. 349. BISCHOFFI.
  bb. Color uniform pale brownish-yellow throughout.
    d. Beak of female much longer than head and thorax, strongly curved antennæ inserted behind its middle. 350. BALANINOIDES.
    dd. Beak of female not longer than head and thorax, feebly curved, antennæ inserted at its middle. 351. OCULARIS.

aa. Elytral intervals distinctly alternating in width; elytra uniform pale brownish-yellow. 352. HELVOLA.

348 (8689). THYSANOCNEMIS FRAXINI Lec., 1876, 214.

Elongate-oblong. Reddish-brown, rather thickly clothed with long, very coarse reddish-yellow hair-like scales; elytra with a broad postmedian transverse band, narrowed at the suture, less densely pubescent and of a darker color. Antennæ inserted at apical fourth of beak, male, at middle, female. Thorax one-third wider than long, sides feebly curved, disc narrowed and slightly constricted in front, finely and densely punctured. Elytra oblong, at base nearly one-half wider than thorax, sides parallel and nearly straight to apical third, striæ with large, close-set punctures; intervals slightly convex, nearly smooth; front tibiæ of male shorter, broader, sinuate and densely fringed with long hairs on the inner side. Fifth ventral broadly and feebly impressed. Length 3.2—3.7 mm.

Lake, Marion and Posey counties, Ind., scarce; April 21—June 8. Ithaca and West Point, N. Y., June 8. Ranges from New England and Canada to Illinois, south to the District of Columbia. Occurs on ash (*Fraxinus*) in the seeds of which it breeds. Bred from hazel-nuts at Wooster, Ohio, in June. (*Dury.*) The dark cross-bar of elytra is often very faint. Casey (1892, 426) redescribed this species under the name *horridula*, giving the locality as Southern California. Later (1910, 128) he corrected the locality but not the name. A comparison of Indiana specimens with LeConte's type shows them to agree in every particular. It is the only one of the five species at hand having the front tibiæ of male densely fringed, and LeConte was mistaken in making that a leading generic instead of a specific character.

349 (——). THYSANOCNEMIS BISCHOFFI sp. nov.

Elongate-oval. Dark reddish-brown to piceous, rather thinly clothed with short clay-yellow and fuscous scales, the latter forming four indistinct stripes on thorax and a broad, irregular V-shaped crossbar on elytra, the angle of the V crossing the suture at or just behind the middle; this dark bar often bordered behind near apical third with a narrow angulate cross-bar of pale scales; antennæ and legs pale brownish-yellow; scutellum grayish-white. Beak of female very slender, as long as head and thorax, antennæ inserted at middle; of male somewhat stouter, one-fifth shorter, antennæ inserted at apical third. Thorax two-thirds wider than long, sides strongly rounded, suddenly narrowed and constricted near apex, disc finely and densely punctate. Elytra shorter and broader than in *fraxini;* striæ with fine, close-set punctures; intervals flat, finely granulate, each with a row of large, suberect whitish scales. Third and fourth ventrals distinctly longer than in *fraxini*, each very little shorter than the second. Fifth ventral not impressed. Length 3.2—4 mm. (*W. S. B.*)

Marion County, Ind., June 22. Bowmanville, Ill.; August 15—Sept. 4. Bloomsburg, N. J.; Leng collection. Commonly con-

fused in collections with *fraxini* but very distinct by characters given in key and by the much broader thorax and longer third and fourth ventrals. Named in honor of Edward A. Bischoff, of Newark, N. J., who has taken this and many other interesting species in New Jersey and at other points near New York City.

350 (——) THYSANOCNEMIS BALANINOIDES Schæff., 1908, 217.

Elongate-oval. Pale brownish-yellow throughout, above very thickly clothed with lanceolate, yellow, hair-like scales, each interval with a row of wider ones. Beak of female very slender, polished and almost impunctate; of male one-third shorter, slightly stouter, finely and sparsely punctate. Antennæ inserted at basal two-fifths, female, just in front of middle, male, first joint of funicle very slender, as long as the next three, second nearly twice as long as third, 3—7 oblong, subequal. Thorax short, three-fourths wider than long, sides strongly curved, suddenly narrowed and feebly constricted near apex; sculpture hidden by the dense transversely placed scales. Elytra oblong-oval, one-fourth wider at base than thorax, sides parallel to apical third, then broadly rounded to apex; striæ fine, their punctures small, close-set, each closed with a small oval yellow scale. Under surface of abdomen thickly clothed with pale yellowish hairs, of sterna with small silvery-white elliptical scales. Suture separating fourth and fifth ventrals obsolete except near the margins in female, more distinct in male, the fifth ventral with a large, deep, median circular impression in the latter sex. Length 3.2—4 mm.

Lake County, Ind., June 5. Edgebrook, Ill., July 26; taken in numbers by Liljeblad. Known also from New Jersey and Texas. More elongate and paler than *ocularis*, with much longer and very strongly curved beak. The abdomen of female appears to have but four ventral segments on account of the almost obsolete fourth suture.

351 (——). THYSANOCNEMIS OCULARIS Casey, 1910, 129.

Form of *fraxini*, less robust. Brownish-yellow, thinly clothed with paler, rather short scales, the intervals with single rows of longer suberect ones. Beak of male short and thick, of female more slender and one-fourth longer. Thorax one-half wider than long, sides strongly curved, narrowed and constricted near apex, disc finely and densely punctate. Elytra two- fifths longer than wide, striæ shallow, rather coarsely punctate. Legs with long sparse hairs on the inner side; front tibiæ of male broadly sinuate at apical half. Fifth ventral smaller than in *fraxini* and not impressed. Length 3—3.2 mm.

Knox County, Ind., June 8. Described from Iowa. Distinguished from *fraxini* by uniform color, thinner and shorter vestiture and unimpressed fifth ventral, and from *helvola*, which it resembles closely, by the equal elytral intervals.

352 (8690). THYSANOCNEMIS HELVOLA Lec., 1876, 214.

Oblong, convex. Uniform pale brownish-yellow, clothed with short silken yellow hairs; legs yellow. Beak nearly alike in the sexes; longer

than head and thorax, very slender, strongly curved, nearly smooth; antennæ inserted at apical two-fifths, male, just behind the middle, female. Thorax twice as wide as long, sides strongly rounded, disc finely and densely punctured, subcarinate. Elytra elongate-oblong, one-fourth wider at base than thorax, striæ impressed; intervals nearly flat, the third and fifth wider and a little more convex. Male with fifth ventral medially impressed and pygidium very large and conspicuous. Length 3.3—3.8 mm.

Posey County, Ind., rare. Bloomsburg, Trenton and South Jersey, N. J., August 6—Sept. 3. Ranges from Ontario and New Jersey to Illinois, south to Kentucky and District of Columbia. Breeds in seeds of ash.

III. Plocetes Lec., 1876. (Gr., "curled" + "form.")

Beak stout, as long as thorax, carinate, coarsely and densely punctured and with three fine elevated lines on each side; antennæ inserted one-fourth from its tip, scape not quite reaching eyes, funicle 7-jointed, first joint stout, as long as the next three united, second slightly longer than third, 3—7 subequal; third and fourth ventrals but little shorter than first and second, fifth one-half longer than fourth; pygidium covered; legs stout, femora with a small tooth beneath; tarsal claws with a long, slender tooth not bent inwards. One species is known.

353 (8691). Plocetes ulmi Lec., 1876, 213.

Elongate-oval. Black, clothed with small brown and piceous scale-like hairs; elytra with an irregular transverse band of white pubescence on apical third, the hairs more dense near the suture; scutellum white; antennæ and legs dark reddish-brown. Thorax scarcely wider than long, sides feebly rounded, narrowed in front of middle; disc densely and deeply punctured and with a narrow smooth median line. Elytra conjointly oval, subdepressed, nearly one-half wider than thorax; striæ fine, their punctures quadrate; intervals flat, densely rugose. Length 3.5—4 mm.

Frequent throughout Indiana; May 11—June 22. Taken on leaves of sedge near borders of ponds. Batavia and West Point, N. Y., June 3. Occurs throughout New Jersey, June—July. Ranges from New York to Michigan, south to Florida. "On elm, making a similar noise to the plum curculio." *(Riley.)* On the button-bush, *Cephalanthus occidentalis* L. *(Ulke.)* The basal half of elytra is brown, the apical half largely velvety-black.

IV. Chionanthobius Pierce, 1912-b. (Gr., "snow blossom" + "to live on.")

Beak slender, cylindrical, curved, as long as thorax, male, as head and thorax, female; antennæ inserted at apical third, male, at middle, female, funicle 7-jointed, the first joint as long as the

next two, the others diminishing in length; eyes very large, narrowly separated, coarsely granulated; tarsal claws cleft into two strong teeth which are nearly subequal in length.

354 (——). CHIONANTHOBIUS SCHWARZII Pierce, 1912-b, 168.

Oval, very robust. Dark reddish-brown, closely covered with scales which completely hide the body; head, beak, legs and antennæ pale reddish-brown; scutellum white; elytra with five irregular crossbands of elongate scales, viz., humeral band golden; narrow post-humeral band white; median band broad, brownish-black with spots of varying length; postmedian band white, very irregular; apical band golden-brown with black spots of varying length; under surface with white and yellow scales. Beak of male striate, carinate and sparsely punctate; of female, more slender, very sparsely punctate. Thorax strongly narrowed in front, sides straight on basal third. Elytra at base one-third wider than thorax; striæ feebly impressed, evenly punctate, the punctures closed by scales; intervals flat. Length 5.5 mm.

Plummer's Island, Md.; July 6—August 11. Taken in numbers by Schwarz, the adults feeding on the berries of the fringe tree, *Chionanthus virginica* L., the larvæ developing in the seeds. Enterprise, Florida, July 10. (Ent. News XXVII, 144.)

V. TYLOPTERUS Lec., 1876. (Gr., "protuberance" + "wing.")

Beak slender, curved, cylindrical; antennæ inserted one-third from its tip; scape slender, reaching the eyes, funicle 7-jointed, first joint as long as the two following, second slightly longer than third; club elongate-oval; eyes large, narrowly separated; ventral segments 1—4 subequal, fifth as long as third and fourth united; femora not toothed; claws with a large tooth near base.

355 (8692). TYLOPTERUS PALLIDUS Lec., 1876, 215.

Elongate-oblong, robust. Piceous-brown, densely clothed with pale yellow and ash-gray scale-like hairs, which wholly conceal the sculpture; antennæ and legs reddish-yellow. Elytra each with a large callus or tubercle on the third interval at the declivity, and with two irregular cross-bars of brown hair, one just in front of the callus, the other starting from an oblong black spot near middle of suture and running obliquely forward to the third interval each side; the two brown bars separated by a very narrow undulating white one; first, third and fifth intervals elevated behind basal third and bearing a few minute tufts of black hairs; scutellum white. Beak naked, shining, the basal half finely and sparsely punctured. Thorax slightly wider than long, sides feebly rounded from base to beyond middle, then strongly converging to the much narrowed apex. Base of elytra one-third wider than that of thorax and strongly elevated above the latter. Length 4 mm.

Posey County, Ind., rare; April 12. St. Louis, Missouri. Beaten from the buds of wild grape. Recorded heretofore only from Texas. Breeds in berries of *Forestiera*, entering the ground to pupate. (*Pierce*, 1916.)

VI. Tychius Schön., 1826. (L. A proper name.)

Small oval or elongate-oblong species (Fig 69) having the beak somewhat swollen at base and feebly narrowed toward apex; funicle 6- or 7-jointed, its two basal joints longer, the others short, subequal; ventral segments unequal, first and second longer, subequal, third and fourth together longer than second, the sutural angles of second extending over the sides of third to the fourth (Fig 22, d); tips of elytra conjointly rounded, wholly concealing the pygidium. Four species and one variety, all having the funicle 7-jointed and the elytra without erect setæ, are known from our territory.

Fig. 69. *Tychius venustus*, Fab. A British species. (After Wood.)

KEY TO EASTERN SPECIES OF TYCHIUS.

a. Beak thick, only feebly diminishing in size from base to apex; scales of upper surface all very narrow and hair-like.

b. Body broadly oval: second joint of funicle but slightly shorter than first; larger, 4—4.7 mm. 356. SORDIDUS.

bb. Body more elongate; second joint of funicle much shorter than first, but little longer than third.

c. Smaller, 2.3—2.5 mm.; thorax slightly longer than wide. 357. PICIROSTRIS.

cc. Larger, 3.5 mm.; thorax wider than long. 358. LILJEBLADI.

aa. Beak thick at base, becoming much more slender toward apex; elytra with a few scattered rounded scales mingled with the narrow ones; length 3—3.6 mm. 359. ARATOR.

356 (8696). Tychius sordidus Lec., 1876, 217.

Oval, convex, robust. Black, densely and uniformly clothed with small slender scales, silvery gray to yellowish in color and slightly more condensed along the suture. Beak barely as long as thorax, slender, straight, cylindrical, pubescent except at tip, finely and densely punctate, feebly striate. Thorax slightly wider than long, sides broadly and evenly curved, apex scarcely one-half as wide as base; disc deeply and densely punctate. Elytra oblong-oval, much wider than thorax, one-fourth longer than wide; striæ well impressed; intervals flat. Hind femora feebly toothed. Length 4—4.7 mm.

Ranges from Illinois and Iowa to Louisiana and Texas. Pierce states (1907, 273) that in the latter states it breeds in the seed pods of the wild or false indigo, *Baptisia bracteata* Ell., and *B. leucantha* T. & G. The larvæ eat the pod clean, then eat their way out and pupate in the ground. Many scattered scales of the elytra are glistening metallic yellow.

356a (——). Tychius sordidus carolinæ Casey, 1910, 134.

Differs from typical *sordidus* in having the thorax notably smaller, the sides less rounded and more rapidly converging from base; scutellum

broader, less densely incrusted with scales; elytra more elongate, a fourth longer than wide, their vestiture more uniform, not so evidently mingled with isolated glittering scales. Length 4 mm.

Southern Pines, North Carolina.

357 (——). TYCHIUS PICIROSTRIS Fab., 1787, 101.

Elongate-oval. Piceous to dark reddish-brown; above usually densely and evenly clothed with narrow hair-like, yellowish-gray scales, beneath with oval, silvery-white ones; antennæ, apical third of beak and legs pale reddish-brown. Beak about as long as thorax, densely scaly from base to insertion of antennæ at apical third, female, or apical fourth, male, beyond which it is smooth, shining, finely and sparsely punctate. Thorax slightly longer than wide, sides feebly curved from base to middle, thence rounded to apex which is scarcely constricted; disc densely and finely punctured, the punctures hidden by scales. Elytra at base one-fifth wider than thorax, sides feebly converging from base to apex, which is rather broadly rounded; striæ very fine, punctured; intervals flat, each with two rows of scales. Length 2.3—2.5 mm.

Ithaca, Batavia, Waterville and McLean, N. Y.; April 1—July 31; common locally, especially on pear trees. (*Knight.*) "In extraordinary numbers at Lake Champlain." (*Casey.*) Paris, Maine, Mt. Washington, N. H., Sherborn and Framingham, Mass.; mating June 21—July 9. The pubescence varies much in density, in thinly clothed specimens the apical half of elytra showing dull red beneath the scales. Lives in Europe in capsules of the red clover, *Trifolium pratense* L. This is the *Miccotrogus picirostris* of Europe. However, in the genus *Miccotrogus* of Schönherr the funicle has but six joints, whereas the present species has seven distinct ones. It is therefore retained in *Tychius*. It is also the *Tychius griseus* of Schæffer (1908, 217.)

358 (——). TYCHIUS LILJEBLADI sp. nov.

Form and size of *arator*. Color and vestiture much as there, the elytra without scattered rounded scales. Beak very feebly tapering from base to apex; antennæ inserted at its apical third; second joint of funicle one-half the length of first. Thorax one-fourth wider than long, sides almost straight from base to middle, then strongly rounded to apex. Elytra as in *arator*. Femora unarmed. Length 3.5 mm. (*W. S. B.*)

Steuben County, Indiana, July 16. Resembles *arator* in general appearance but the beak as in *sordidus*, from which it differs by its smaller size, more narrowed form, shorter second funicular joint and unarmed femora. Named for Emil Liljeblad of the Field Museum, Chicago, whose collection of Rhynchophora placed at our service has furnished much valuable information for this work.

359 (8694). Tychius arator Gyll., Schön., 1836, 414.

Oblong-oval, rather robust. Black, densely clothed throughout with elongate, strigose, dark clay-yellow scales, with a few paler, larger, non-strigose ones on apical half of elytra; antennæ and apical third of beak pale reddish-brown; legs darker. Beak feebly curved, scaly and punctured as in *picirostris*. Basal joint of funicle as long as the next two; second two-thirds as long as first. Thorax one-third wider than long, apex less than one-half as wide as base, disc finely and densely granulate-punctate. Elytra one-fourth wider than thorax, one-half longer than wide, deeply striate, the strial punctures indistinct; intervals convex, alutaceous. Hind femora with a small acute tooth. Length 3—3.6 mm.

Recorded from Illinois, Missouri and Texas.

VII. Paragoges Lec., 1876. (Gr., "protracted.")

Small oblong species having, in addition to the characters of generic key, the beak as long or longer than thorax, rather slender, cylindrical, nearly straight; antennæ inserted at apical third, scape not reaching eye, funicle 6-jointed, first and second joints longer, 3—6 gradually slightly broader; club oval, annulated, the first joint larger than the others combined; femora not toothed; tarsi spongy beneath, third joint broader, bilobed; pygidium partly exposed. One species is known from California and another is herewith described from Florida.

360 (——). Paragoges minimus sp. nov.

Oblong-oval. Dark reddish-brown, thinly clothed with dull reddish and dirty whitish scales, the latter oblong, much the larger, arranged transversely on the thorax and along the intervals on the apical third of elytra; scutellum white; antennæ and legs paler reddish-brown. Beak stout, as long as thorax, almost glabrous, grooved each side above and behind the antennæ. Eyes rather large, rounded, narrowly separated, coarsely granulated. Thorax as long as wide, sides feebly curved, constricted near apex; disc finely and densely punctate. Elytra oval, one-third wider at base than thorax, sides straight to middle, then broadly curved to the separately rounded tips; striæ with coarse, close-set punctures, each of which is closed by an elongate whitish scale; intervals flat, rugose, each bearing behind the middle a row of the large, distant, oblong white scales. First ventral coarsely and sparsely punctate; remainder of abdomen almost impunctate and glabrous. Length 1.5 mm. (*W. S. B.*)

Ft. Myers, Fla., March 11; taken by sweeping. The large white scales are so arranged as to form an ill-defined W-shaped mark across the apical third of elytra, immediately in front of which is a large, faint darker blotch across the suture.

Tribe IX. OTIDOCEPHALINI.

Snout beetles of a peculiar ant-like form, due to the thorax being longer than wide, narrowed at base and somewhat pedunculate, and the elytra elongate-oval, convex, usually widest behind the middle and rounded at tip. Except in *Erodiscus* they have the beak rather stout, straight and subcylindrical; antennal grooves converging behind and directed below the eyes, which are rounded and finely granulated; antennæ inserted about one-third from tip of beak; scape long, slender, reaching beyond middle of eyes; funicle 7-jointed, first joint stouter, but only slightly longer than second, 3—7 rounded, gradually a little wider; club oval, pointed, pubescent; thorax without postocular lobes; prosternum short, broad, not emarginate; ventral segments nearly equal, their sutures straight; legs rather long; front and middle coxæ rounded, the former prominent; hind coxæ oval; femora somewhat clavate, usually toothed; tibiæ truncate at tip, without spines; tarsi dilated, spongy beneath, the third joint broader, bilobed; claws with a broad, not very prominent tooth. The majority of the species are shining black, with sparse, erect setæ. About 27 species, belonging to three genera, represent the tribe in the United States, ten of which are known from our territory. The literature treating of them is as follows:

Horn, Geo. H.—"*Otidocephalus*"—*in* Proc. Am. Phil. Soc., XIII, 1873, 448.

Casey, T. L.—"Coleopterological Notices, IV—Otidocephalini," *in* Ann. N. Y. Acad. Sci., VI, 1892, 426.

Schæffer, Chas.—"New Rhynchophora—II" *in* Journ. N. Y. Ent. Soc., XV, 1907, 75.

KEY TO GENERA OF OTIDOCEPHALINI.

a. Beak long and slender, extending to third ventral segment of abdomen; scape not reaching eyes; joints of funicle elongate.
I. Erodiscus.

aa. Beak much shorter and stouter; scape reaching middle of eyes; outer joints of funicle rounded.

b. Elytra elongate-oval; humeri and inner wings present.
II. Otidocephalus.

bb. Elytra ovate, rounded on sides; humeri and inner wings absent.
III. Oöpterinus.

I. Erodiscus Schön., 1826. (Gr., "like a heron.")

In this genus the beak is very slender, tapering, finely striate and coarsely punctate on sides, male, very finely and sparsely punctate near base, female; antennæ inserted at apical third,

male, at middle, female; joints of funicle all elongate, subequal, and somewhat obconical; eyes large, oblong-ovate, flattened; thorax oblong-ovate, strongly narrowed behind, the hind angles prominent, acute; elytra oblong-ovate, convex; femora strongly clubbed toward apex, toothed beneath. The genus is placed in a separate tribe in the Biologia but our single species is more conveniently included here.

361 (8602). Erodiscus tinamus Lec., 1884, 30.

Black, shining, clothed with a very few long, erect, white hairs; antennæ and tarsi reddish-brown, legs piceous. Head finely alutaceous, minutely and sparsely punctate. Thorax very convex in front, tubularly constricted at base, deeply, very sparsely and evenly punctured. Elytra not wider than thorax, very convex, tips rounded; disc with rows of deep, distant punctures. Length 4.5—6 mm.

Biscayne Bay, Fla., May 16. The types were from Cape Jupiter. Known only from southern Florida.

II. Otidocephalus Chev., 1832. (Gr., "owl"+ "head.")

This genus, sufficiently characterized under the tribal heading, is represented in our territory by eight species. They are for the most part gall-infesting weevils, though Pierce (1916) records some species as breeding in twigs.

KEY TO EASTERN SPECIES OF OTIDOCEPHALUS.

a. Femora toothed; beak in both sexes without a large dorsal excavation.

b. Thorax and elytra uniform black or piceous, the latter with erect setæ; tarsal claws with a large, acutely angulate internal tooth.

c. Tooth of femora large, triangular.

d. Elytra with stiff, erect, white setæ, intermingled with longer more slender, blackish hairs, all arranged in single rows on the intervals; strial punctures of elytra feebly impressed, rather coarse, deep and somewhat distant. 362. floridanus.

dd. Elytra with only long blackish, erect setæ, forming single rows on the intervals. 363. myrmex.

cc. Tooth of femora small, narrow.

e. Eyes separated by much less than one-half their width; thorax almost without punctures. 364. lævicollis.

ee. Eyes widely separated.

f. Head very sparsely punctate and with a large elongate fovea between the eyes; elytra strongly widened behind the middle and with only a few short white setæ toward the apex. 365. chevrolatii.

ff. Head closely and coarsely punctate and without a fovea between the eyes; elytra feebly widened behind and with numerous long setæ. 366. scrobicollis.

bb. Thorax and basal half of the elytra pale reddish-brown; elytra without erect setæ; tarsal claws broadly swollen within toward base, but not at all angulate. 367. DICHROUS.

aa. Femora not toothed; beak of male with a large and very deep excavation near the middle.

g. Body wholly black; head sparsely punctate. 368. CAVIROSTRIS.

gg. Body reddish-brown; elytra blackish except toward base; head coarsely and closely punctate. 369. POEYI.

362 (10,966). OTIDOCEPHALUS FLORIDANUS Casey, 1892, 433.

Subcylindrical, slender. Black, shining; above bristling with long, sparse, white and piceous erect setæ, indiscriminately mingled, the piceous ones longer and thinner. Head sparsely but distinctly punctate, without frontal fovea. Beak short, thick, scarcely two-thirds as long as thorax, striate near base, its sides coarsely and closely rugose-punctate. Thorax much longer than wide, widest at middle, sides feebly curved, disc finely, sparsely and unevenly punctate. Elytra more than twice as long, and behind the middle twice as wide as thorax; intervals with minute and very remote punctures. Length 4 mm.

Jacksonville, Ormond, Sanford and Dunedin, Fla.; Feb. 17—Apr. 14. Beaten from oak. Known only from Florida. "A slender species, somewhat resembling *myrmex* in form, but distinct in the mixture of long white and blackish setæ, the longer elytra and in the subcylindrical and not obovate thorax." (*Casey.*)

363 (8605). OTIDOCEPHALUS MYRMEX Hbst., 1797, 56.

Elongate, subcylindrical, strongly convex, the sides slightly compressed. Black, shining, the upper surface with numerous long, erect, blackish hairs; those on under surface and legs white, condensed in a narrow line along the sides and on the scutellum. Beak short, stout, basal half bisulcate above. Head coarsely and sparsely punctate, frontal fovea very small. Thorax obovate, strongly convex, slightly longer than wide, apex wider than base; disc with sides almost smooth, the middle rather coarsely and sparsely punctate, the hairs pointing forward. Elytra oblong, sides almost parallel, widest at apical fourth; disc with rows of rather coarse, feebly impressed, rather close-set punctures. Tibiæ distinctly sinuate beneath. Length 3.8—4.5 mm.

Marion and Orange counties, Ind., scarce; May 30—June 1. Beaten from oak and hickory. Abundant near New York on hickory, grape, hazel, oak and other plants in June and July. Ranges from Quebec and New England to Iowa, south to Georgia. A common species, distinguished by its narrow form, long blackish and somewhat abundant setæ of the upper surface, and the large triangular femoral tooth.

364 (8608). OTIDOCEPHALUS LÆVICOLLIS Horn, 1873, 451.

Black, strongly shining; antennæ and tarsi piceous; upper surface very sparsely covered with moderately long, erect setæ, white in color but becoming blackish on the front of disc of thorax, and shorter and denser

near its base, very remote in single rows on the elytra; scutellum and sternal side pieces densely white pubescent. Beak coarsely punctate and rugose on sides, feebly sulcate above between the antennæ. Head very convex, sparsely and finely punctate. Thorax but slightly longer than wide at middle, strongly narrowed toward base, very minutely and remotely punctate. Elytra twice as long, and, behind the middle, nearly twice as wide as thorax; disc with rows of fine, rather distant punctures. Length 3.3—4.3 mm.

Abundant near New York City on hickory, May to July. Ranges from Fall River, Mass., and Litchfield, Conn. (June 14), to Ohio and southward to Texas. Riley states that it has been bred from Cynipid galls on oak. Easily known by the large, prominent, approximate eyes and fine, unimpressed punctures of the elytral rows.

365 (8607). OTIDOCEPHALUS CHEVROLATII Horn, 1873, 450.

Subcylindrical, strongly convex. Black, polished, almost glabrous above; scutellum and a narrow line along sides of lower surface with dense white hairs. Beak short, polished, the sides with two coarsely punctured sulci. Thorax about one-third longer than wide, the apical two-thirds strongly convex, basal third narrowed; disc sparsely and very coarsely punctured, more densely toward apex. Elytra less than twice as long as wide, broadly oval, very convex; disc with rows of very fine, rather close-set punctures, those on the sides impressed. Femora with a minute acute tooth; tibiæ almost straight. Length 3.7—4.5 mm. (Fig. 70.)

Fig. 70. *A*, beetle × 8; *B*, front view of head. (Original.)

Frequent throughout the northern half of Indiana; less so southward; May 21—June 17; beaten from oak. Abundant near New York City on elm, hickory, grape, hazel and other plants, June and July. Ranges from New England and Quebec to Iowa, Georgia and Texas. Pierce (1916) states that it breeds in galls of *Amphibolips* on live oak trees in Texas. Readily known by the large frontal fovea, wide, strongly inflated elytra and almost glabrous upper surface. This is the *O. myrmecodes* of Chevrolat, which name was preoccupied.

366 (8606). OTIDOCEPHALUS SCROBICOLLIS Boh., Schön., 1843, Pt. 2, 205.

Black, shining, bristling with long, coarse, erect, blackish setæ, with a few short, paler, subrecumbent hairs interspersed. Head and beak coarsely, closely and unevenly punctate; beak not quite as long as thorax, rugosely striate on the sides. Thorax obovate, base strongly narrowed; disc coarsely, deeply and densely punctured, more sparsely on the sides

Elytra oblong-ovate, strongly convex, slightly wider behind middle than at base, disc with feebly impressed rows of rather coarse, close-set punctures. Femoral tooth minute, acute. Length 4—4.2 mm.

Yaphank, L. I., July 13; various localities in New Jersey. Ranges from New York and Pennsylvania to Ohio, Georgia and Texas. Readily known by the sparse dual vestiture, coarse sculpture and long, slender, feebly toothed femora.

O. coræ Champ., a Mexican species, differing from *scrobicollis* in its more abundant black and white erect setæ and in having the elytral rows of large punctures distinctly impressed, has been reported from Terza, Miss. by Harned.

367 (8610). OTIDOCEPHALUS DICHROUS Lec., 1876, 191

Elongate, subcylindrical, less convex above than usual. Reddish-brown, shining; elytra piceous-black in apical half or two-thirds, very sparsely clothed with very short, recumbent white hairs. Head with a deep, oval frontal fovea; eyes large, coarsely faceted. Thorax nearly one-half longer than wide, sides feebly rounded; disc rather sparsely, coarsely and unevenly punctate. Elytra elongate-oval, gradually wider to behind the middle; disc with distinctly impressed rows of rather coarse, close-set punctures. Femoral tooth very small. Length 4—5 mm.

Arch Creek, Fla., March 21. "Fort Capron, Enterprise and Lake Harney, rare; on dead palmetto leaves." (*Schwarz.*) Known also from Georgia.

368 (10,969). OTIDOCEPHALUS CAVIROSTRIS Casey, 1892, 437.

Black, polished; legs, beak and antennæ piceo-rufous. Body almost glabrous. Beak robust, but little more than half as long as thorax, strongly though not densely punctate and with a large, deep excavation just behind the middle in male. Thorax distinctly longer than wide, widest at two-fifths from base; disc finely, evenly and rather closely punctate. Elytra scarcely more than one-half longer than thorax, gradually widened and inflated to behind the middle, strongly convex; disc with rows of feebly impressed rather close-set punctures. Length 1.9 mm.

The unique male type is from southern Florida. Both it and the next species are easily separated from all the others by the unarmed femora and the deep median excavation of the beak in the male.

369 (——). OTIDOCEPHALUS POEYI Chev., 1832, 107.

Oblong-oval. Dark reddish-brown, the antennæ, legs and basal fifth of elytra paler. Head densely and coarsely punctate. Beak three-fourths as long as thorax, coarsely and closely punctate. Thorax obovate, strongly convex, finely and rather densely punctate. Elytra oblong-oval, scarcely twice as long as thorax, striæ finely punctate, the intervals with a very few suberect white hairs. Length 2.5 mm.

Key Largo, Florida. A Cuban species which occurs sparingly in southern Florida. Schæffer suggests that possibly *cavirostris* and *poeyi* are the same.

III. Oöpterinus Casey, 1892. (Gr., "egg" + "wing.")

This genus differs from *Otidocephalus* in having the eyes very small; elytra ovate, rounded on the sides, widest a little before the middle, gradually narrowed and acutely rounded behind; humeri obsolete, scutellum wanting.

370 (8609). Oöpterinus perforatus Horn, 1873, 451.

Elongate-oval. Brownish-piceous, shining, antennæ and legs still paler; upper surface with sparse, rather short, semi-erect whitish setæ. Head sparsely, coarsely punctate and with a small, rounded frontal fovea. Beak rather stout, feebly curved, about as long as thorax, coarsely and irregularly punctate. Thorax obovate, longer than wide, strongly narrowed toward base, very coarsely, deeply and densely punctate. Elytra two-thirds longer than wide, with rows of very fine distant punctures; intervals with minute, distant punctures, each bearing a slender, white, recurved hair. Femora broadly emarginate near apex, not toothed. Length 3.3—3.7 mm.

Deer Park, Maryland, April 7. Pennington Gap, Va., June 27. Clayton, Georgia, July. Recorded also from Pennsylvania, Iowa, Michigan and Cincinnati, Ohio. The elytra are sometimes pale reddish-brown. "Its being pallid, only suffused with piceous, and entirely apterous, point strongly to a subterranean habit, probably living on bulbs or other roots." (*Hamilton.*) Breeds in cynipid galls on roots of oak. (*Pierce.*)

Tribe X. MAGDALINI.

The members of this tribe differ from all others having the front coxæ contiguous by the hind angles of thorax being acute, prominent and more or less produced over the base of the elytra. In addition, they have the beak slender, cylindrical, as long as thorax; antennal grooves reaching the lower edge of the eyes which are rounded and distant from the thorax; antennæ usually inserted near the tip, male, or about the middle, female, slender, feebly elbowed; scape slender, slightly clavate, curved near the end and usually reaching the eyes; elytra oblong, subdepressed, widely separated at base by the scutellum, separately rounded at tip exposing part of the pygidium; ventral segments unequal, first and second long, connate, 3—5 short, equal; front coxæ contiguous, prominent; middle and hind ones not widely separated, the latter small, oval; femora not club-shaped, sometimes toothed; tibiæ

strongly clawed at tip; tarsi spongy beneath, the third joint broader, bilobed; claws variable. One genus represents the tribe in the United States. The principal papers treating of its members are by

Horn, G. H.—"Magdalis"—*in* Proc. Amer. Phil. Soc., XIII, 1873, 452.

Fall, H. C.—"A Brief Review of Our Species of Magdalis with Notes and Descriptions of other N. Am. Rhynchophora," *in* Trans. Amer. Ent. Soc., XXXIX, 1913, 23—72.

I. MAGDALIS Germ., 1817. (A proper name.)

To this genus, as above characterized, belong about 22 species and four varieties from the United States, of which 12 species and one variety occur in our territory. The males have the dorsum

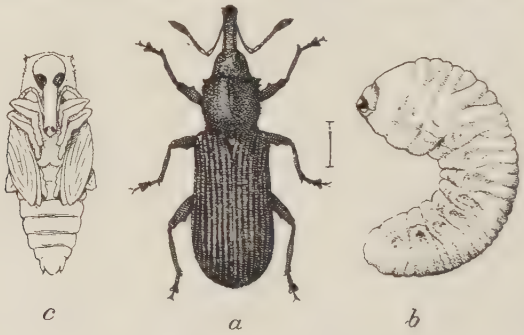


Fig. 71. *Magdalis œnescens* Lec. *a*, Adult; *b*, larva; *c*, pupa, all × 6. (After Chittenden.)

of the abdomen with eight segments while the females have but seven, and therefore a much longer pygidium than the male, in which sex it is twice as broad as long. All are more or less pubescent when fresh, but the pubescence is easily removed and usually lacking in cabinet specimens. All are bark borers, pupating in the wood of partly dead or dying trees. For convenience they are separated into two groups.

KEYS TO GROUPS OF EASTERN MAGDALIS.

a. Claws simple; thorax not serrate on the sides except in *barbicornis*. GROUP I.

aa. Claws toothed at base; thorax serrulate or dentate on the sides near the front. (Fig. 71.) GROUP II.

GROUP I.

To this group, which has been especially treated by Fall, belong six species and one variety from our territory. He separates them as follows:

KEY TO EASTERN SPECIES OF GROUP I.

a. Antennal club normal in both sexes.

b. Femora not toothed, the front ones obliquely impressed at base on the lower surface; hind angles of thorax feebly produced and scarcely at all turned outward.

c. Elytral intervals wider than the striæ; sides of thorax in front nearly straight; length 3—4.5 mm. 371. HISPOIDES.

cc. Elytral intervals narrower than the striæ; punctuation very coarse; sides of thorax gradually curved; length 4.5—5.5 mm. 372. PERFORATA.

bb. Femora toothed, not impressed at base; hind angles of thorax more or less produced and divergent.

d. Antennæ inserted distinctly behind the middle of beak in both sexes, at basal two-fifths in male and basal one-third in female.

e. Black, lustre dull; thoracic punctures not confluent toward the middle. 373. AUSTERA.

ee. Black, elytra with dark blue or greenish lustre; thoracic punctures longitudinally confluent toward the middle. 373a. var. SUBSTRIGA.

dd. Antennæ inserted at or beyond the middle in the male and about or slightly behind the middle in female.

f. Elytra with a bluish tinge; antennæ of male inserted at the middle, of female at basal two-fifths; beak of male as long as, of female, distinctly longer than thorax. 374. GENTILIS.

ff. Black, opaque; antennæ of male inserted distinctly beyond the middle of beak. 375. ALUTACEA.

aa. Antennal club of male greatly elongate and thickly clothed with erect, velvet-like hairs; femora not toothed. 376. BARBICORNIS.

371 (8620). MAGDALIS HISPOIDES Lec., 1876, 418.

Elongate, wedge-shaped. Black, feebly shining. Beak as long as thorax, slightly curved, coarsely not densely punctured; antennæ inserted behind its middle, first joint of funicle much stouter than second. Thorax slightly longer than wide, sides nearly straight, feebly constricted near apex; disc densely and rather coarsely punctate. Elytra at base one-fourth wider than thorax, sides straight, feebly diverging from base; striæ not impressed, composed of close-set quadrate punctures; intervals flat, each with a row of minute punctures. Body beneath finely and sparsely punctate. Length 2.5—4 mm.

Ottawa, Canada, April 5. Ranges from Newfoundland and Maine to Michigan and British Columbia, south to Washington, D. C., and New Mexico. Occurs on pine.

372 (8611). MAGDALIS PERFORATA Horn, 1873, 453.

Elongate, wedge-shaped. Black, strongly shining, antennæ and tarsi piceous. Beak nearly as long as head and thorax, strongly curved, rather finely not closely punctate; antennæ inserted near its middle. Thorax longer than wide, sides parallel behind the middle, base strongly bisinuate; disc coarsely, deeply and densely punctate. Elytra gradually wider behind;

disc with striæ of large, deep, close-set, quadrate punctures; intervals very narrow, each with a row of minute punctures. Under surface coarsely and deeply punctate. Length 4.5—5.5 mm.

On pine near New York City, May to July. Enterprise, Fla., April 14. Ranges from Canada, New Hampshire and Massachusetts to Michigan and Iowa, south to Florida. Easily recognized by its narrow elytral intervals and coarse, dense sculpture. Occurs mainly on white pine.

373 (——). MAGDALIS AUSTERA Fall, 1913, 29.

Elongate-oblong. Dull black,elytra often with a faint tinge of blue. Beak slightly longer than thorax, feebly curved, finely and rather densely punctate; front with a small, deep fovea. Thorax wider than long, strongly constricted near apex, base strongly bisinuate; disc densely and finely punctate, often with a trace of a fine median smooth line. Elytra parallel or nearly so in male, slightly widened behind in female; striæ with rows of coarse, oblong, feebly impressed punctures; intervals nearly flat, rugose, each with a row of rather coarse punctures. Femoral tooth small, acute. Length 3—4.5 mm.

Lake and St. Joseph counties, Ind.; frequent locally on the gray pine, *Pinus divaricata* Ait.; May 25—July 11. Ranges from Maine and Ontario, Canada, to Michigan, south to North Carolina. Occurs on white and other pine. The small size, more parallel elytra, dull black hue and rougher surface sculpture distinguish it from *M. lecontei* Horn, which name it doubtless bears in many collection, *lecontei* not being found east of the Rocky Mountains.

373a (——). MAGDALIS AUSTERA SUBSTRIGA Fall, 1913, 29.

"Black; elytra dark blue or greenish, moderately shining. Second joint of funicle less than twice as long as wide and shorter than the two following united. Thorax closely punctate, the punctures becoming more elongate toward the middle, where they are more or less conspicuously longitudinally confluent. Elytra evidently but not strongly widened behind, the intervals as in *austera*. Length 3.2—4 mm." (*Fall.*)

West Point, N. Y., June 7. Wales, Maine, June 22. Described from Tyngsboro, Dover and Brookline, Mass., and Peekskill, N. Y.

374 (8621). MAGDALIS GENTILIS Lec., 1876, 418.

Elongate-oblong. Black; elytra with a bluish tinge. Beak curved, finely and closely punctured. Thorax slightly longer than wide, sides parallel from base to middle, thence rounded to tip which is tubularly constricted; disc densely not coarsely punctured. Elytral striæ feebly impressed, their punctures close-set; intervals nearly flat, wider than the striæ, finely reticulate and bearing small rugose punctures. Femoral tooth large, acute. Length 4 mm.

Described from Lake Tahoe, Cal. Fall records it with doubt from Paris and Kineo, Maine; Fitzwilliam and Mt. Washington, New Hampshire. Occurs on spruce. A specimen from Newfoundland in the Leng collection is also doubtfully referred to this species.

375 (8627). MAGDALIS ALUTACEA Lec., Bull. U. S. Geol. & Geog. Surv., IV, 1878, 463.

Black, opaque, alutaceous. Beak of male stout, alutaceous, slightly wider beyond the base of antennæ which is at apical third; of female more slender, less dull, antennæ inserted at middle. Head rather sparsely punctate. Eyes of male separated by only one-half, of female by three-fourths, the width of the beak. Thorax slightly longer than wide, hind angles acute, divergent, surface densely, not coarsely punctate. Elytral intervals rather wide, flat, the striæ not impressed. Length 4.2 mm.

Southport, Maine, July, August. Occurs in high altitudes from New Hampshire, Lake Superior, Banff, Alberta and Vancouver to New Mexico; probably boring in the terminal twigs of pine. "Differs from *gentilis* by the divergent hind angles of thorax, less convex and less deeply striate elytra, with wider intervals which are not rugose but alutaceous." (*LeConte.*)

376 (——). MAGDALIS BARBICORNIS Latr., 1804, 103.

Black, subopaque; antennæ and tarsi reddish-brown. Club of male very long, fuscous; of female shorter, ovate. Beak short, stout, only as long as head, dilated beyond the antennal insertion, which is about at middle. Thorax as long as wide, sides rounded in front, disc somewhat flattened, coarsely punctate, that of female with three foveæ. Elytra deeply striate-punctate, intervals convex, very finely strigose. Femora not toothed. Length 3.5—4 mm.

West Point, N. Y., June 1. A European species taken on Long and Staten Islands, N. Y., and on elm in June at Dorchester, Mass. The male is easily known by the antennal club, which is as long as the entire scape and funicle, and hairy. In the two females at hand the thorax bears two or three blunt teeth each side in front of middle, thus forming a connecting link with the next group.

GROUP II.

Nine species of Magdalis having the claws toothed are known from the United States, six of which occur in our territory. In none of them does the scape of antennæ completely pass the eyes as stated by Horn. All have the femora toothed.

KEY TO EASTERN SPECIES OF GROUP II.

a. Mesosternum with an elongate tubercle between the middle coxæ; head elongate-conical; length 4—6 mm.

b. Black; scutellum densely clothed with white pubescence; scape not reaching the eyes. 377. BARBITA.

bb. Reddish-brown, thorax and under surface usually black in male; scutellum not distinctly pubescent; scape reaching the eyes in female, passing their front margin in male. 378. ARMICOLLIS.

aa. Mesosternum not protuberant; scape of antennæ usually reaching or passing beyond the middle of eyes; black species.

c. Larger, 4.5—6 mm.; upper surface with distinct yellowish pubescence; tibiæ, tarsi and antennæ usually reddish-brown. 379. OLYRA.

cc. Smaller, not over 4 mm.; upper surface without yellowish pubescence; legs and antennæ black or piceous.

d. Head elongate-conical; thorax densely punctate; elytral striæ deep. 380. SALICIS.

dd. Head broadly conical; thorax much more sparsely punctate; elytra feebly striate.

e. Hind angles of thorax broadly flattened to form thin plates covering the basal edge of elytra; disc of thorax distinctly alutaceous between the punctures. 381. PANDURA.

ee. Hind angles of thorax not flattened; disc of thorax feebly alutaceous; elytral striæ very slightly impressed . 382. INCONSPICUA.

377 (8615). MAGDALIS BARBITA Say, 1831, 6; ibid, I, 265.

Elongate, wedge-form, robust. Black, feebly shining, antennæ and tarsi piceous. Beak slender, cylindrical, alutaceous, nearly as long as head and thorax, finely and rather closely punctate, female; one-third shorter, less curved, slightly dilated near tip, male; antennæ inserted near apical third, female; at apical fifth, male. Thorax nearly as wide as long, sides feebly curved and with a short spine and several small teeth near the front angles; disc rather coarsely, densely and shallowly punctate, with an abbreviated narrow smooth median line. Elytra slightly broader behind, deeply striate, striæ coarsely punctured; intervals convex, transversely finely wrinkled. Abdomen finely and sparsely punctate; femora toothed. Length 4—6 mm.

Frequent throughout Indiana; May 13—July 11. Usually found beneath bark of recently dead oak and hickory. Many records from New Jersey, Caldwell to Anglesea; May and June. Ranges from New England and Canada to Dakota, south to Georgia, Kentucky and Texas. "The larvæ live in great numbers in the bark or between it and the wood of dead and felled hickories, the beetles being most abundant from the middle to the end of June." (*Harrington.*) "Breeds also under the bark of elm, pupating in cells in the bark." (*Felt.*) In Indiana the males of this and the next species are far less common than the females.

378 (8625). MAGDALIS ARMICOLLIS Say, 1823, 312; ibid, II, 175.

Form of *barbita*. Females nearly uniform pale reddish-brown; males usually piceous to black, the antennæ, tarsi and elytra more or less reddish-brown. Beak of male stout, shorter than thorax, widened near tip, alutaceous, finely and closely punctate; of female more slender, longer than

thorax more coarsely punctate. Thorax as wide as long, sides feebly curved, serrate near apex; disc coarsely and very densely punctate and with a faint median line. Elytra deeply striate, striæ coarsely punctured; intervals narrower, feebly convex, finely granulate. Abdomen of male polished and impunctate along middle. Length 3.5—6 mm. (Fig. 72.)

Fig. 72. Adult, larva and pupa, × 9. (After Forbes.)

Common throughout Indiana, May 11—July 25. New England, New York and New Jersey; June—September. Range the same as that of *barbita*. Breeds in and beneath the bark of elm. According to Packard (1890, 229), "The burrows are about an inch and a half long running with the grain and in the cambium layer. From the cell at the end an exit pierces the bark as far as the outer layer. The beetles usually attack the upper branches, but several small elms were found with the bark of the trunk undermined nearly to the ground." *M. pallida* Say, described from Indiana, is a pale form of the male of *armicollis*. Three males at hand from Ithaca, N. Y., are wholly black.

379 (8617). MAGDALIS OLYRA Hbst., 1797, 6.

Form and size of *barbita*, which it closely resembles. Differs in characters given in key and in having the head more broadly conical; beak somewhat shorter; scape of antennæ more slender, reaching middle of eyes in male. Thorax with punctures much finer and hind angles more flattened and divergent; striæ of elytra less deep, more finely punctured; intervals wider and less convex. Length 4—6 mm.

Not yet recognized from Indiana. Willow Springs, Ill., July 27. Many records near New York City. May—June. Ranges from New England and Canada to Minnesota, south to North Carolina and Mississippi. Breeds under bark of hickory and oak.

380 (8622). MAGDALIS SALICIS Horn, 1873, 455.

Elongate, slender. Black, feebly shining; tarsi piceous. Beak stout, shorter than thorax, alutaceous, sparsely and finely punctate; antennæ inserted at apical fourth, scape reaching middle of eyes, male; at apical third, scape barely reaching eyes, female. Thorax slightly longer than wide, sides nearly straight with two or three short, blunt teeth near apex; disc very densely and rather coarsely punctate, with a trace of a median smooth line. Elytra with sides parallel in male, distinctly widened behind middle, female; intervals wider than the striæ, convex, very finely, transversely wrinkled. Length 3—4 mm.

Southern half of Indiana, scarce; Apr. 21—June 14. North Penobscot, Me., June 24. Described from the "Middle States." Recorded from Massachusetts by Fall. Bred from the chestnut by Chittenden. The scutellum is often densely clothed with white pubescence, though stated otherwise by Horn.

381 (8624). MAGDALIS PANDURA Say, 1831, 7; ibid, I, 265.

Oblong, robust, widened behind. Black, opaque, antennæ and tarsi often reddish-brown. Beak finely alutaceous, sparsely and finely punctate; of male stout, shorter than thorax, widened near apex, antennæ inserted at apical fourth; of female more slender, longer than thorax, antennæ inserted just in front of middle. Thorax slightly broader than long, widest at middle; sides feebly curved, denticulate on apical half; punctures of disc separated by more than their own diameters, their intervals strongly alutaceous. Elytra distinctly widened behind, rather deeply striate; intervals feebly convex, minutely wrinkled. Length 2.5—3 mm.

Frequent throughout Indiana, more so in the southern counties; May 3—July 12. Occurs on elm and oak. Near New York City in the Newark district, Westville and shore counties. Ranges from Ontario and Massachusetts to Wisconsin, south to Missouri and Georgia. Bred from the black walnut, *Juglans nigra* L. (*Fall.*)

382 (8623). MAGDALIS INCONSPICUA Horn, 1873, 456.

Form of *pandura*, less widened behind. Black, opaque, antennæ and tarsi piceous. Beak of the sexes as in *pandura*, more sparsely and finely punctate. Head broadly oval, very sparsely and finely punctate. Thorax as wide as long, broadly constricted near apex and somewhat at base, the middle of disc more convex; punctures less distinct than in *pandura*, their intervals finely granulate. Scutellum small, black. Elytral striæ very feebly impressed, their punctures fine and indistinct; intervals flat, minutely and densely granulate. Body beneath coarsely but not densely punctured, abdomen more shining, sparsely and finely granulate. Length 3—4.5 mm.

Common throughout Indiana; June 4—July 13. Hopatcong and Caldwell, N. J.; West Point, N. Y., June 3, on butternut leaves. (*Robinson.*) Ranges from Massachusetts and Ontario

to Dakota, south to Ohio, Missouri and Texas. The intervals of elytra are flatter and have more of a silken lustre and the striæ are much less distinctly punctured than in *pandura*.

Tribe XI. BALANINI.

THE NUT AND ACORN WEEVILS.

One genus, *Balaninus*, of striking individuality, comprises this tribe and includes the beetles popularly known as Nut and Acorn Weevils. Their most obvious character is the bulky body combined with the long and slender beak, which in the female of some species is much longer than the body, though in others it is as short or shorter than the body, while it is always shorter in male. The beak is used by the female for drilling the holes in the nuts or acorns through which the eggs are deposited in the kernel, and is longer in proportion to the thickness of the husk and shell of the nut. The mouth parts at the end of the beak are also peculiar, the movement of the mandibles (Fig. 9) being vertical instead of horizontal, as is usual in Coleoptera. The antennæ are elbowed, very long and slender, funicle 7-jointed, club elongate-oval, pointed, annulated and pubescent; eyes rather large, flat, nearly rounded, finely granulated; front coxæ contiguous; thorax without postocular lobes; scutellum distinct; femora clavate, strongly toothed; tarsi dilated, claws divergent, toothed. In general appearance the beetles are ovate, broadest at base of elytra, tapering toward apex, one-fourth to one-half inch in length, exclusive of beak, brown, mottled with scales of lighter shade; the species resembling one another so closely as to make specific identification very difficult.

The sexes of most of the species are very dissimilar, the beak being invariably longer in the female, twice as long as that of the male in the species attacking nuts which have a thick husk (Fig. 73, *b, c*); not greatly longer, however, in the species attacking annual-fruited oaks. The female is also usually larger than the male, but some individual exceptions have been noted. The pygidium, fifth ventral and first and second ventral segments are all modified in the male, these modifications being noted in the keys and descriptions which follow. The fifth ventral segment has usually a small apical area bare with a tuft of hair each side more or less developed. The first and second ventral segments are often broadly impressed or slightly concave, and there is often a sharp cleft between the second and third segments, apparently due to the position in which the beetle, as in the case of the sometimes protruded pygidium, has died, thus making the third seg-

ment appear below the level of the second. There is also apparently some variation in the degree of development of the sexual characters of the male. In the female the abdomen is more convex, the last ventral rounded at tip or feebly concave, the pygidium scarcely exposed and with short pubescence.

The species of *Balaninus* attack chestnuts, hickories, pecans, hazelnuts and acorns, the adults issuing from the earth where the nuts have fallen in early summer, and laying eggs in the young nuts from which hatch larvæ that feed on the kernel until full grown. The larvæ leave the nut after it has fallen to burrow in the ground for a distance varying from one to ten inches, and fashion there a small cell in which they pass the winter. There are variations in the length of adult life, some species completing their oviposition quickly and dying soon after, this being the case with those attacking hazelnuts; others continuing to oviposit all summer. A small percentage of the larvæ may remain for more than one winter in their cells; and while some species are confined to a single food plant, others are less exacting. It is possible that all the acorn weevils can thus accommodate themselves to a change of food plant in seasons of necessity. In some sections the nut weevils become of economic importance; in West Virginia, Brooks (1916) states that the chestnut worms spoil at times 25 to 50 per cent of the crop which in each of several counties is worth $3,000 or more. The pecan worm does equal injury, and acorns suffer to even a greater extent; so that it is apparent that the genus *Balaninus* is capable of costing nut growers $100,000 or more annually.

No effective remedy has been suggested; stomach poisons are useless because the larvæ, feeding within the growing nuts, cannot be reached; and the same is true of contact poisons. Cultivation of the soil where nut trees are planted for profit will help by destroying the hibernating larvæ, and trapping in bunches of dry leaves hung on the trees will farther reduce the number of egg-laying adults. After the nuts are gathered, fumigation with bisulphide of carbon will kill those larvæ that have not hatched; scalding and drying to kill such larvæ, and cold storage to arrest their development, have also been recommended.

Interesting observations have been made on the natural enemies of the nut weevils, including a bracon parasite, *Urosigalphus armatus* Ashm., which deposits its egg in the orifice made by the beetle and parasitizes 25 per cent. or less of the *Balaninus* larvæ; several species of ants which break into the earthy cells; and larvæ of predaceous Coleoptera. The short-tailed shrew also

finds and devours the larvæ in the ground beneath nut-bearing trees, where a labyrinth of burrows made by the shrew in searching for the larvæ has been recorded. Davis has also noted (1907, 116) that the larvæ are cut short in their development while still in the acorn by squirrels, these animals biting a small part of the cup so as to expose the base of the acorn, which is then punctured to ascertain by the odor if there is a larva within. If so, the hole is enlarged and the larva eaten, but if no larva is present the sound acorn is discarded. The principal papers dealing with *Balanini* taxonomically are by

Horn, Geo. H.—Proc. Am. Phil. Soc., XIII, 1873, 458—460.
Blanchard, Frederick—Bull. Br. Ent. Soc., VII, 1884, 107—108.
Casey, Thos. L.—Ann. N. Y. Acad. Sci., IX, 1897, 655—664; Can. Ent. XLII, 1910, 114—128.
Chittenden, F. H.—Proc. Ent. Soc. Wash., X, 1908, 19—26.

I. Balaninus Germ., 1821. (Gr., "an acorn.")

When Horn in 1873 published a synopsis of North American *Balaninus* he recognized but six species. Since that time 36 additional forms have been described from the United States, many of which are doubtless synonyms. Of these Blanchard and Hamilton each described one; Casey, in the two papers cited, 29, and Chittenden five. Of the 42 nominal species 26 have been recorded from east of the Mississippi River. After a careful study of the descriptions and a long series of specimens, we have concluded that only ten of the 26 are to be regarded as really valid species. Of the remaining 16, eleven are, without much doubt, synonyms or mere varieties, while the remaining five have been described from scanty material and without accurate information as to food plants. These are difficult to recognize with certainty and are, therefore, not included in the keys, but are hereafter briefly treated without definite reference to previously described species. All five are evidently closely related to *confusor*. The ten species which we regard as valid beyond doubt are for convenience separated into two groups as follows:

KEY TO GROUPS OF EASTERN BALANINUS.

a. Beak of female conspicuously longer than body. Group A.

aa. Beak always curved and shorter than body, or at most equal thereto; pygidium of male convex, hairy; all species found on oak except *obtusus*, which breeds on hazel. Group B.

GROUP A.

Our four species of this group are separated as follows:

KEY TO EASTERN SPECIES OF GROUP A.

a. First joint of antennal funicle shorter than second; larger, 8—11 mm.; pygidium of male with silken hairs; occurs on chestnut. 383. PROBOSCIDEUS.

aa. First joint of funicle not shorter than second, usually much longer.

b. Surface clothed with hairs; femoral tooth rectangular, strong; tibiæ at tip strongly mucronate; pygidium of male convex, punctate, hairy; length 7—9 mm.; occurs on hickory. 384. CARYÆ.

bb. Surface clothed with scales.

c. Beak of female straight nearly to end; pygidium of male concave, fimbriate; length 8.5—9 mm.; occurs preferably on biennial-fruited oaks. (*quercus* Horn=male.) 385. RECTUS.

cc. Beak of female regularly curved from base to apex; pygidium of male with tuft of hair; length 4.5—7 mm.; occurs on chestnut. 386. ALGONQUINUS.

383 (8965). BALANINUS PROBOSCIDEUS Fab., 1775, 142.

Ovate. Dark brown, densely clothed with golden or clay-yellow scale-like hairs; thorax at middle usually broadly fuscous; elytra with fuscous spots irregularly but closely placed; body beneath densely clothed with pale yellow silken scales. Beak often nearly twice as long as body, female, not longer than body, male, straight at base, curved at tip. Elytra each separately rounded at tip. Femoral tooth broad, triangular, its apex more acute, directed outwards. Male with joints of funicle shorter, 6 or 7 combined equal to scape; fifth ventral segment truncate, with a small glabrous area at apex and a tuft of hair each side. Pygidium of female scarcely exposed, with short sparse pubescence. Length 8—11 mm. (Fig. 73.)

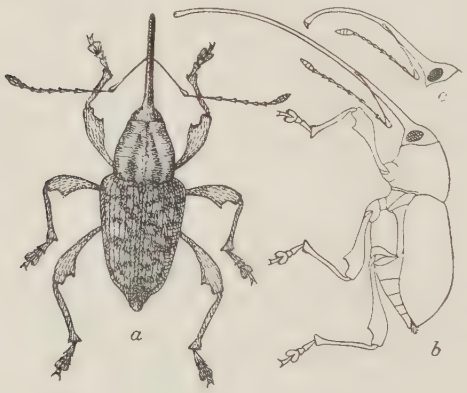
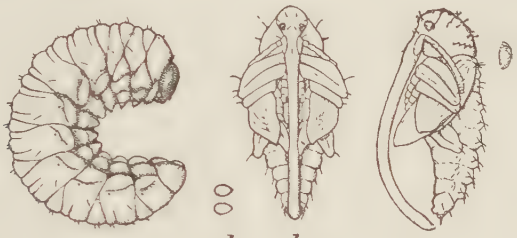


Fig. 73. *a*, Female beetle; *b*, same in outline from side; *c*, head, beak and antenna of male. All × 3. (After Chittenden.)

Not yet taken, but should be found in southern Indiana. Occurs from Massachusetts and Rhode Island (Providence, Aug. 19), to North Carolina on the Atlantic Coast, westward to southern Ohio, Tennessee and Kansas, appearing in August and continuing to November. Known as the larger chestnut weevil and breeds in native and imported chestnuts and chinquapins. It has

been observed in West Virginia by Fred E. Brooks, to issue from the earth late in August, laying its eggs through the spines of the bur, an operation noted in one instance as occupying 56 minutes. The larvæ (Fig. 74) eat the nuts, falling within them and then leaving them to burrow into the ground, where they remain as



a *d* *b* *c*

Fig. 74. Larger chestnut weevil. *a*, Larva; *b*, *c*, female pupa; *d*, eggs. All enlarged. (After Chittenden.)

larvæ until the following July, when pupation takes place. *B. caryatrypes* Boh. is now regarded as a synonym of *proboscideus* and the latter is easily known from all other American species by its having the second joint of funicle longer than first.

The following names have been proposed for two smaller, more western forms which we regard only as varieties:

B. hariolus Casey, 1910, 114. Smaller, less stout and more acuminate, with slightly coarser elytral striæ, shorter legs and beak; fifth ventral of male feebly impressed, with apex moderately sinuate and briefly, sinuately beveled. Length 8—8.5. Indiana. (?)

B. cylindricollis Casey, 1910, 114. Smaller, more slender, vestiture almost uniform pale gray; beak shorter and nearly straight; thorax not constricted at apex. Length 7.5 mm. Tennessee.

384 (8962). BALANINUS CARYÆ Horn. 1873, 460.

Ovate. Brownish, subopaque, very sparsely pubescent with yellowish hairs; above and beneath less mottled than usual. Beak of female much longer than body, that of male shorter, very slender, slightly thickened basally. First joint of funicle longer than second. Thorax wider than long, sides strongly curved, slightly sinuate in front; disc moderately convex, densely and coarsely punctured. Elytra oval, moderately convex; striæ punctured, intervals flat, roughly punctured. Scales beneath paler, narrow, hair-like. Femoral tooth large, prominent, with the outer edge perpendicular, forming with the apex of the femur a right angle which is not rounded. Fifth ventral of male subconcavely flattened, sparsely clothed, apex broadly and feebly sinuate; last ventral of female more deeply impressed. Length 7—9 mm. (Fig. 75.)

Vigo Co., Ind., scarce; Oct. 15. Batavia, New York, Sept. 14.

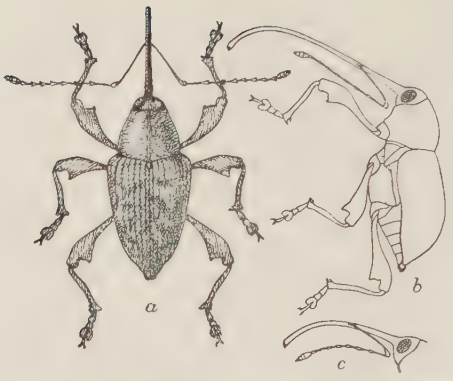


Fig. 75. Pecan weevil. *a*, Female; *b*, side view of same in outline; *c*, head, beak, antennæ of male. All × 2½. (After Chittenden.)

Extends from New York to the Gulf States, westward to Iowa. In Texas the female begins to oviposit in August, and in Georgia larvæ have been found in nuts as late as January. This species, known as the pecan weevil, attacks hickory and pecan nuts and was originally bred from hickory nuts by John Akhurst and described from bred specimens. Its habits have been repeatedly observed but it may be interesting to quote the statement by Brooks that one hour and fifteen minutes is required to drill the hole through which the egg is deposited.

385 (8963). BALANINUS RECTUS Say, 1831, 16; ibid, I, 279, female. (*B. quercus* Horn, 1873, 458, male.)

Oblong-ovate. Brownish, clothed with pale brown hair-like scales, nearly uniform on thorax; elytra rather closely spotted with pale orange, somewhat confluent into short transverse lines. Beak longer than body, straight nearly to end, then curved downward, female; slightly shorter than body and curved throughout, male; extremely slender, not at all enlarged basally in either sex. First joint of funicle longer than second. Thorax one-third wider than long, sides rather strongly curved, surface densely punctured, very sparsely pubescent, slightly denser along median line. Elytra oval, gradually narrowed to tip, disc moderately convex, striate, striæ punctured; intervals densely but not roughly punctured. Femoral tooth with outer edge oblique, the entering angle obtuse, not rounded. Pygidium of male deeply concave at tip, the concavity smooth, shining and surrounded by an acute rim which is fimbriate with long hairs. Fifth ventral with a small, partially denuded medial area in apical half. Length 8.5—9 mm.

Northern half of Indiana, frequent; not yet taken but probably occurs in the southern counties; August 23—Oct. 10. Abundant from Massachusetts to Michigan and Colorado, south and southwest to Florida and Texas. This is the best known species attacking acorns of biennial-fruited oaks, especially those of *Quercus rubra*, *coccinea*, *velutina* and *imbricaria*, the adults occurring from July to October and having the habit, not known in other species, of sealing the egg-hole with excrement, thus forming a whitish spot.

The following names have been proposed for a number of forms here included under the name *rectus*, viz.:

B. orthorhynchus Chitt., 1908-a, 26. Smaller (6.2—7.5 mm.); femoral tooth small, acutely produced distally, its entering angle rounded. Described from West Virginia.

B. cuneatus Casey, 1910, 115. First and second funicular joints long and equal in length, each a little shorter than the third and fourth combined. Length 8.8 mm. West Virginia.

B. sparsellus Casey, 1910, 116. Elytra more cuneiform, more elongate and more gradually acute behind; second funicular joint of male but little shorter than the first. Length 8.5 mm. New Jersey.

The student may be in position to associate these names with part of his specimens, but to us they seem unnecessary, as we regard them at the most as mere varieties.

386 (——). BALANINUS ALGONQUINUS Casey, 1910, 118.

Oblong-ovate. Moderately slender, elytra subacute at tip. Piceous, clothed with brownish hair-like scales; thorax with a paler line near the side; elytra with numerous pale yellow, more or less confluent spots, sometimes forming bands; metasternum of male in well preserved specimens with a small rounded, condensed patch of yellow scales each side of median line. Beak of female nearly twice as long as body, of male shorter than body, strongly curved in both sexes. First joint of funicle longer than second, the bristling black setæ at the apical part of the other joints sometimes unusually conspicuous. Thorax of female longer than wide, of male as wide as long; disc densely punctured, the median line slightly elevated. Femoral tooth small, larger in female, the entering angle rounded. Male with pygidium convex at tip, punctured and pilose; fifth ventral flattened or impressed medially, a more or less dense tuft of hair each side of apex; fifth ventral of female more or less transversely concave. Length 4.5—7 mm. (Fig. 76.)

Crawford Co., Ind., scarce; May 24. Occurs from Canada to North Carolina, westward to Tennessee, the adults appearing in July and continuing to October, rarely surviving until the following year. This is the *B. rectus* of Horn, Blanchard and most writers on economic entomology, and is known as the smaller chestnut weevil. It often deposits its eggs in the nuts after the burs have opened, leading to the larvæ remaining in the nuts after they are gathered and

Fig. 76. Lesser chestnut weevil. *a*, Female, × 5; *b*, side view of same; *c*, head of male. (After Chittenden.)

developing during the winter. The fact that this lesser chestnut weevil was not the true *rectus* of Say was first set forth by Casey. He has given (1910, 118) descriptions of four forms, each of which seems applicable to the weevil in question. We have therefore adopted the first one given as the specific name. The other three proposed by him are as follows:

B. setosicornis, fifth ventral of male flattened medially, subglabrous posteriorly, a dense tuft of hairs each side of apex, the two patches nearly contiguous medially. Length 6.2—6.5 mm. West Virginia.

B. macilentus, fifth ventral of male more scantily clothed; form narrower, vestiture looser. Length 6—6.5 mm. West Virginia.

B. perexilis, fifth ventral of male pubescent at tip; "fifth ventral female (?) with deep rounded concavity in about apical half;" very small and slender, by far the slightest in form. Length 4.5—4.8 mm. New Jersey.

These names do not seem to indicate more than individual variations, here introduced to indicate the tendency to variation in secondary sexual characters. The deep rounded concavity of fifth ventral described by Casey in *perexilis* female is present in a male of *algonquinus*, length 6.5 mm., from Crawford County, Indiana; it seems merely an exaggeration of the usual male character in this species, and leads to a doubt of the sex of Casey's specimen.

GROUP B.

Our six species of this group are separated as follows; the first and the last being the more strongly differentiated species.

KEY TO EASTERN SPECIES OF GROUP B.

a. Outer edge of femoral tooth forming a right angle with femur; beak of male distinctly shorter than that of female.

b. Beak of female nearly or quite as long as body; femoral tooth strong; pubescence mottled; fifth ventral of male concave with tuft of hair each side; length 5—7.5 mm.; on oak, preferably annual-fruited species. 387. NASICUS.

bb. Beak in both sexes shorter than body.

c. Hairs of pygidium of male produced into a closed tube; pubescence spotted; occurs on oak. 388. PARDALIS.

cc. Pygidium of male with a simple tuft of hairs.

d. Femoral tooth stronger; beak of male scarcely half the length of body.

e. Femora stout and more strongly inflated; scape of antennæ as long as three basal funicular joints united; thorax more curved at sides and more distinctly narrowed at base than in *nasicus*, with the sublateral stripe of pale scales more evident; elytral vestiture variegated with a transverse pale band near apical third; occurs on *Quercus nana*. 389. CONFUSOR.

ee. Femora less stout; scape as long as joints one and two of funicle united; thorax more narrowed at base, its sublateral stripe less evident; vestiture less dense, causing a sooty appearance; occurs on *Q. alba* and other biennial-fruited oaks; length 5.5—7.5 mm. 390. BACULI.

dd. Femoral tooth weaker, the femur clavate or swollen beneath the tooth forming a small erect denticle at summit of swelling; beak of male more than half the length of body; scape as in *baculi;* length 5.5—6.5 mm. Southern states only; probably on oaks. 391. HUMERALIS.

aa. Outer edge of femoral tooth oblique, forming an obtuse angle with lower edge of femur; beak nearly equal in the two sexes; pubescence condensed on and behind scutellum; length 6—8 mm. Occurs on hazel. 392. OBTUSUS.

387 (8961). BALANINUS NASICUS Say, 1831, 16; ibid, I, 279.

Oval, robust. Dark chesnut brown, densely clothed with dark brown and clay-yellow scales; the latter forming a broad stripe each side on basal half of thorax and large scattered spots with a tendency to form bands on elytra; scales of under surface paler and broader. Beak of female about as long as body, that of male shorter, evenly curved in both sexes; first joint of funicle longer than second. Thorax short, distinctly wider than long, sides broadly curved, constricted behind apex; disc coarsely and densely punctate. Elytra triangular, the sides scarcely curved and converging very rapidly to apex. Femoral tooth strong, triangular, its outer edge perpendicular, forming with the apex of the femur a right angle which is not rounded; tibiæ, especially the hind ones, feebly mucronate. Pygidium of male with moderately long silken hairs; of female scarcely exposed, with short, sparse pubescence. Length 5—7.5 mm.

Common throughout Indiana; April 25—Sept. 4. Lake City and Dunedin, Fla., Oct. 31. Ranges from Massachusetts and Canada west to Kansas and Colorado, south to Florida. Found from April to October on various species of oak.

The Balanini occurring on oaks, which do not possess the distinctive characters of *rectus*, viz.: a straight beak in female and concave fimbriate pygidium in male, are far from a homogeneous assemblage. In possessing a curved beak that is scarcely ever longer than the body in female and notably shorter in male, they do agree, but there are differences even in the length of beak, and still more noticeable differences in color, maculation and development of femoral spine. Say's name *nasicus* clearly applies to all such specimens as cannot be identified with one of the descriptions that follow, because *nasicus* was the first in respect to date. This may lead the student, whose material comes from widely separated regions or includes depauperated or other unusual individuals, into grouping under this name a more or less hetero-

geneous mass of specimens, of which the extremes seem misplaced. Such a result is, however, preferable, in our opinion, to attempting to associate names with individual specimens or even groups of specimens without strongly correlated structural and biological characteristics. In retaining (as species) *pardalis, confusor, baculi* and *humeralis*, we have been guided in part by their recognition by field workers and their established ecological relation with oaks of different species.

388 (——). BALANINUS PARDALIS Chittenden, 1908a, 25.

Oval, robust. Dark reddish-brown to piceous, densely clothed with clay-yellow scales; elytra strongly mottled with small brown spots, these sometimes united and forming bands. Beak of female four-fifths as long as body, that of male less than two-thirds, enlarged at base and apex, moderately curved. First funicular joint longer than second; scape as long as next three joints. Thorax one-fourth wider than long, strongly curved near middle, narrowed near apex, the lateral pale stripe well developed. Femora strongly clavate, not reaching beyond elytra, the tooth large and prominent, its entering angle nearly right. Fifth ventral of male flat at middle, strongly bilobed at apex. Length 7.2—7.6 mm.

Wells County, Ind., scarce; Sept. 8. Occurs from Rhode Island to North Carolina, westward to Arkansas and Texas. Bred from acorns of *Quercus platanoides, velutina, pedunculata, alba* and *prinus*. This species differs from *nasicus* by the shorter and thicker beak with apical extremity enlarged in male, by shorter femora and more spotted elytral vestiture.

Casey (1910, 123) separates somewhat doubtfully *B. virginicus* on account of its longer legs, beak of female longer, not enlarged apically in either sex. Length 7.2—7.6 mm. West Virginia.

389 (11,213). BALANINUS CONFUSOR Hamilton, Can. Ent., XXV, 1893, 309.

Form, shape, color and vestiture similar to that of *nasicus*, the sublateral stripe of paler scales on thorax and transverse pale band near apical third of elytra more evident. Beak about as long as elytra, or two-thirds the length of body in female, shorter in male, thickened and punctured at base. First joint of funicle longer than second. Femora stouter, and more strongly inflated than in *nasicus* with the tooth much smaller and oblique. Male with pygidium convex, punctate, covered apically with long yellow hairs; fifth ventral with subglabrous space at tip, a tuft of hair on each side. Length 6.5—7.5 mm.

Lake County, Indiana, rare; July 2. Beverly Hills, Chicago, Ill., May 21. Batavia, N. Y.; July 4—12. Known from Massachusetts and New York to northern Illinois, south to North Carolina. Distinguished from *nasicus* by the shorter beak, and from

other short-beaked species by the banded elytra as well as by the characters given in key. It is the first short-beaked eastern species described. Reared by Hamilton from acorns of bear or scrub oak, *Quercus nana* Marsh, a biennial-fruited species; and by Brooks from chestnut oak, *Q. prinus* L., an annual-fruited species.

390 (——). Balaninus baculi Chitt., 1908-a, 20.

Elongate-ovate. Sooty or brownish piceous; vestiture scant, composed of short pale gray scales beneath; elytra with many small, dull brown inconspicuous scaly areas, or "almost black with a dusky gray aspect, due to the short whitish hairs which are scattered thinly over the body." Beak of female three-fifths as long as body, more thickened at base; of male slightly shorter, scarcely half as long as body. First joint of funicle longer than second. Thorax one-fourth wider than long, sides almost parallel on basal third then strongly converging and sinuous to apex; disc densely and rather finely punctate. Femoral tooth small, acute, with entering angle weak and rounded. Male pygidium with long tuft of yellowish hairs; fifth ventral with a very small apical bare area, showing the margin with a tuft of hairs each side. Length 5.5—7.5 mm.

Lake, Starke and Laporte counties, Ind., scarce; June 28—Oct. 24. Occurs from New York to Michigan and Nebraska south to Alabama. Infests acorns of *Quercus alba, velutina* and other oaks, including most biennial-fruited species. (*Chittenden.*) "Bred from the acorns of all the biennials in about equal numbers." (*Hamilton.*) This species is known in many collections and is cited erroneously in part by Horn, Blanchard, Hamilton and others, as *uniformis* Lec., which is a Pacific Coast species. The following form we regard as a variety of *baculi.*

B. curtus Chitt., 1908-a, 21. Smaller with wider elytra and paler scales; beak distinctly shorter, more slender, not so abruptly recurved at apex. Length 5.7—7 mm. Occurs in Texas and Florida; reared from acorns of *Quercus velutina* and *rubra.*

391 (——). Balaninus humeralis Casey, 1897, 657.

Very stout and thick. Dark reddish-brown, rather densely clothed with nearly uniform pale clay-yellow scales; thorax piceous. Beak of female nearly as long as body, of male as long as elytra, slender and curved throughout in both sexes. First funicular joint longer than second, the first four joints decreasing rather rapidly in length. Thorax short, fully one-half wider than long, sides subparallel and feebly curved from base to apical fourth, then rounded and sinuate to the tubulate apex. Elytra two-fifths wider and twice as long as thorax, sides rapidly converging from the prominent humeri. Male with pygidium convex, punctate, hairy; fifth ventral narrowly and feebly sinuate at tip, its surface feebly impressed, subtumid each side near apex. Length 5-5—6.5 mm.

Occurs in Georgia and Florida. Very close to *B. baculi* var. *curtus*, and in case of their identity being later satisfactorily established the name *humeralis* has priority by eleven years.

B. parvidens Chitt., from Florida, Alabama and Texas, we have been unable to separate from *humeralis*, though a better information based on breeding from acorns of live oak and turkey oak might make it possible.

392 (8959) BALANINUS OBTUSUS Blanchard, 1884, 107.

Short, oval, robust. Piceous-brown, above thickly clothed with scale-like hairs varying in color from ash-gray to clay-yellow and brown, the ash-gray ones more or less condensed behind the scutellum; thorax with a paler stripe each side; elytra either clay-yellow with scattered brown spots or sooty brown sprinkled with paler spots; under surface with elongate silvery or yellowish scales. Beak of female two-thirds to three-fourths as long as body, that of male slightly shorter. Antennæ inserted a little behind middle, female, slightly beyond middle, male; first joint of funicle longer than second. Elytra about three times as long as thorax, their intervals very broad. Appendices of claws broad, nearly or quite rectangular. Male with pygidium thickly clothed with rather long yellow hair; last ventral impressed and subglabrous at tip, truncate and slightly emarginate, first and second segments broadly impressed; abdomen of female convex, the last ventral rounded at tip. Length 6—8 mm. (Fig. 77.)

Common in the northern third of Indiana on hazel; not taken southward; June 11—28. Ranges from New Hampshire to Texas, westward to Nebraska, always on hazel, usually in June and July. This species is said to be shorter-lived than most others, the beetles dying soon after depositing their eggs. The infested nuts fall early to the ground.

Fig. 77. Hazel-nut weevil. *a*, Females, × 4; *b*, head of same from side; *c*, head of male from side. (After Chittenden.)

It seems probable that the insect before Say in describing *nasutus* could have been no other than the present species. His arrangement of descriptions from long beaks down to short ones suggests that *nasutus* was his shortest beaked specimen, and his mention of the form and of the white pubescence at scutellum could hardly have been prompted by any other *Balaninus*. But in the absence of his type it seems impossible to place his *nasutus* without doubt, and unnecessary to disturb the name which Blanchard assigned to the hazel-nut species.

The following five forms have not been included in the key

to Group B. As already noted, their status is in doubt, due to scanty material and absence of information as to food plant.

B. proprius Casey, 1910, 121. Short, stout, convex. Piceous-black, antennæ paler; vestiture pale gray, variegated on elytra with large brownish clouds. Beak of female not longer than elytra; thorax relatively large in size (as compared with *obtusus*, *confusor*, etc.). Length 6.2 mm. Described from a female without locality label, but probably taken in Indiana.

B. auctus Casey, 1910, 124. Elongate-oval. Body deep black; scales brown, yellowish on sides of thorax and in small scattered spots on elytra. Beak more than half as long as body; femoral teeth large and very acute; fifth ventral segment not notably modified. Length 7 mm. Described from a single male from Buffalo, N. Y.

B. ordinatus Casey, 1910, 124. Described from a male with beak more than half as long as body; femoral teeth large and acute; fifth ventral feebly impressed. Length 7.2 mm. Tennessee.

B. appalachius Casey, 1910, 125. Beak more than half as long as body; femora with strong, acute teeth, the peduncle of front ones notably short and thick; fifth ventral feebly impressed, clothed with finer, more transverse hairs. Length 6.7 mm. Described from two males from West Virginia.

B. parvicollis Casey, 1910, 125. Rather stout, oval. Rufo-piceous, rather densely clothed with elongate, tawny scales, which are sparser and more hair-like in the brownish, transverse spots of elytra. Beak of male longer than half the body; femoral tooth large, very acute; fifth ventral not modified, except that the tip is distinctly sinuate. Length 5.7—6.2 mm. New Jersey.

Tribe XII. ANTHONOMINI.

Our members of this large tribe are distinguished from others of the subfamily Curculionina by having the thorax contiguous to the elytra, not strongly narrowed behind, its hind angles rectangular; front coxæ contiguous; ventral sutures deep, straight; tarsal claws toothed or appendiculate (except in the first four genera); pygidium partly exposed except in a few species. In addition they have the mandibles two-notched and therefore three-toothed at tip; beak cylindrical, usually more or less curved, long and slender; antennal grooves extending to the middle or lower edge of the eyes, directed beneath in a few genera. Antennæ usually long and slender, inserted far behind the tip of the beak; scape slender, generally reaching some point on eye; funicle 5—7 jointed, the first joint stout, generally elongate; club elongate-oval, pointed, usually entirely pubescent, the first joint glabrous in a few species. Eyes rather large, rounded, and distant from the thorax, widely separated above except in *Orchestes* and a few species of *Anthonomus*. Thorax wider than

long, more or less narrowed in front, without postocular lobes, base bisinuate, the middle lobe distinct; scutellum small, oval or rounded, densely pubescent or scaly. Elytra generally wider at base than thorax, striate-punctate, usually separately rounded at tip. Prosternum short in front of the coxæ (except in *Acalyptus*); front coxæ contiguous, large and prominent, hind ones widely separated. Legs rather long and slender (except in *Nanops*); femora clavate, usually toothed; tibiæ armed at tips with either a curved hook or a short straight spine; tarsi and claws variable, the former with third joint bilobed and spongy beneath.

Fig. 78. Structures of Anthonomini. *a*, Antenna of *Acalyptus carpini*; *b*, of *Xanthus pygmæus*; *c*, of *Neomastix solidaginis*; *d*, of *Tachypterus quadrigibbus*; *e*, hind tibia of same; *f*, antenna of *Anthonomus costulatus*; *g*, front tibia of same; *h*, side view of beak, head and antenna of *Macrorhoptus estriatus*; *i*, of *Ephelops triguttatus*; *j*, of *Pseudanthonomus incipiens*; *k*, front view of same of *Nanops schwarzii*; *l*, antenna of *Pseudanthonomus relictus*. (After Dietz.)

The species are small, seldom over 4 and never over 7.5 mm. in length. The males have the beak stouter, more coarsely sculptured and usually less shining, with the antennæ inserted nearer the apex than in females. For the most part they live in the buds, flowers, fruit and seeds of plants, though a few breed in galls. The larvæ pupate in the feeding cell instead of entering the ground.

The principal paper treating of the North American species of this tribe is by

Dietz, Wm. G.—"Revision of the Genera and Species of Anthonomini inhabiting North America" *in* Trans. Amer. Ent. Soc., XVIII, 1891, 177—276, pls. V—VII.

Fall, in the paper cited under *Magdalis*, reviews some of Dietz's species and describes a number of additional ones. Eighteen genera are ascribed to the tribe by Dietz, 13 of which are represented in our territory. The following is his key modified and abridged.

KEY TO GENERA OF ANTHONOMINI.

a. Claws simple.

b. Prosternum long in front of the coxæ, the latter very narrowly separated; hind tibiæ scarcely mucronate; elytra widely and separately rounded at apex, exposing the pygidium; length 2.2—2.8 mm.
I. ACALYPTUS.

bb. Prosternum short in front of the coxæ; hind tibiæ mucronate.

c. Form convex; tibial spines distinct.

d. Antennal grooves directed beneath the eyes (Fig. 78, *i.*); length 1.5 mm.
II. EPHELOPS.

dd. Antennal grooves directed against the eyes; length 2.8 mm.
III. EPIMECHUS.

cc. Form subdepressed; tibial spines very minute; antennal grooves directed toward the eyes; length 1.5—1.8 mm. IV. XANTHUS.

aa. Claws not simple.

e. Claws appendiculate, i. e., armed at base with a short broad tooth. (Fig. 79, *k.*, *l.*)

f. Hind femora thickened, saltatorial (Fig. 18, *b.*); eyes approximate above; beak in repose always folded on the breast.
V. ORCHESTES.

ff. Hind femora slender, normal; eyes not approximate above; pygidium covered. (Fig. 79, *f.*) VI. ELLESCHUS.

ee. Claws armed with an acute tooth.

g. Hind tibiæ with an curved hook at tip.

h. Pygidium wholly covered; tooth of claws long.

i. Beak short and stout, about as long as thorax, first joint of funicle scarcely as long as the next two united (Fig. 78, *h.*); elytra not tuberculate; length 2.5—3 mm.
VII. MACRORHOPTUS.

ii. Beak slender, two-thirds or more as long as body; first joint of funicle as long as the next four or five united (Fig. 78, *d.*); elytra strongly tuberculate; larger, 3—4.5 mm.
VIII. TACHYPTERUS.

hh. Pygidium in part exposed, at least in male; tooth of claws short; funicle 6-jointed. (Fig. 78, *k.*)

j. Abdomen flat, its first and second segments very elongate (Fig. 79, *e.*); pygidium partly exposed in male; femora toothed; larger, 2.5—3.2 mm. IX. ANTHONOMOPSIS.

jj. Abdomen convex, its segments less unequal; pygidium freely exposed in both sexes; femora not toothed; smaller, not over 1.5 mm. X. NANOPS.

gg. Hind tibiæ with a short spine at tip.

k. Antennal grooves directed against the eyes.

l. Funicle 6- or 7-jointed; club elongate-oval. XI. ANTHONOMUS.

ll. Funicle 5-jointed; club broadly oval. (Fig. 78, *c.*)
XII. NEOMASTIX.

kk. Antennal grooves directed beneath the eyes; funicle 6- (rarely 5-) jointed, the fourth joint smaller. (Fig. 78, *j.*, *l.*)
XIII. PSEUDANTHONOMUS.

Nanops and *Ephelops* occur only in Florida. *Alycodes* Dietz, as has been pointed out by both Casey and Fall, is a synonym of *Dorytomus* Steph.

I. Acalyptus Schön., 1836. (Gr., "exposed.")

Here belongs a single small species having the beak slender, curved, as long as head and thorax; antennal grooves beginning near its middle, directed against the middle of eyes; funicle 7-jointed (Fig. 78, *a*), first joint long, robust, 2—7 gradually wider, combined scarcely longer than club, all equally pubescent; front and middle tibiæ not armed, hind ones with a short spine at tip.

393 (8628). Acalyptus carpini Hbst., 1795, 204.

Oval, subdepressed. Piceous, densely clothed above with short, grayish-white pubescence having a yellowish or silvery lustre; beneath less densely pubescent; antennæ and legs reddish-brown. Thorax one-third wider than long, narrowed in front, sides feebly curved, constricted near apex, disc densely and finely punctate. Elytra oval, one-third wider at base than thorax, sides nearly parallel, tips separately broadly rounded, disc indistinctly striate. Length 2.2—2.8 mm.

Lake and Starke counties, Ind., frequent locally; May 9—July 4. Hopatcong, Chester and Orange Mountains, N. J.; May —July. Introduced from Europe. Ranges from Canada and New England to Wisconsin and Kansas. "Occurs on willow in abundance when in blossom." (*Harrington.*) On flowers of *Salix* and *Pyrus*, May 16, Framingham, Mass. (*Frost.*)

II. Ephelops Dietz, 1891. (Gr., "beneath" + "eye.")

Beak rather robust, shorter than head and thorax, feebly curved; antennal grooves beginning about its middle and extending beneath the eyes; antennæ stout, scape short, funicle 7-jointed, first joint very stout, second longer than third, 3—7 wider and shorter (Fig. 78, *i*); pygidium exposed; tibiæ stout, widened to apex, front and middle ones with curved claw, hind ones with spine. The single known species is

394 (11,037). Ephelops triguttatus Dietz, 1891, 261.

Robust, subovate. Black with some lustre; pubescence white, short, very sparse; tip of beak, antennæ and legs reddish-brown; scutellum and a small spot about the middle of the fourth interval densely clothed with white, scale-like pubescence. Thorax feebly constricted near apex, coarsely, not densely punctate. Elytral striæ and punctures coarse, the latter close-set; intervals feebly convex, finely wrinkled. Front thighs armed with a rather large tooth. Length 1.5 mm.

Described from Key West, Fla. Resembles *Anthonomus corvulus* Lec., but smaller. The white scutellum and spot on fourth interval render it easily known.

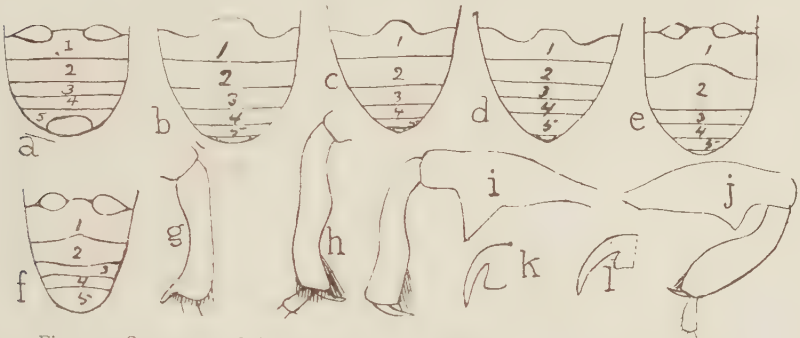


Fig. 79. Structures of Anthonomini. *a*, Abdomen of *Anthonomus scutellaris*, male; *b*, of *A. flavicornis*, male; *c*, of *A. signatus*, male; *d*, of *A. scutellatus*, male; *e*, of *Anthonomopsis mixtus*; *f*, of *Elleschus ephippiatus*; *g*, hind tibia of *Anthonomus elongatus*, male; *h*, front tibia of *A. virgo*, male; *i*, front thigh and tibia of *A. pomorum*; *j*, front leg of *A. julichi*; *k*, *l*, appendiculate claws of *Elleschus*. (After Dietz.)

III. Epimechus Dietz, 1891. (Gr., "over" + "length.")

Beak slender, cylindrical, feebly curved; funicle (in our species) 7-jointed, first joint stout, two-thirds longer than second, 3–7 shorter, gradually slightly wider, scape slender, reaching eyes; front with a linear impression; pygidium concealed in the female; tooth of front femora distinct, of middle and hind ones minute; claws simple, diverging. Five species occur in the western and southwestern states, the following being the only one known from the East.

395 (——). Epimechus nivosus sp. nov.

Elongate-oval, convex. Piceous-brown, everywhere rather thickly clothed with very loosely arranged, oval, white scales; antennæ and legs pale reddish-brown; beak, club and middle of femora darker. Beak of female finely striate, feebly carinate, rather densely and finely punctate, antennæ inserted near apical third. Thorax short, subconical, one-third wider at base than long, sides evenly converging from base to apex, disc rather finely, densely and deeply punctate. Elytra oval, but slightly wider at base than thorax, sides straight to middle, then gradually converging to the conjointly rounded apex; strial punctures rather coarse, close-set; intervals feebly convex, minutely punctate. Under surface very finely and sparsely punctate. Length 2.8 mm. (*W. S. B.*)

Dunedin, Florida, October 23; one female taken by sweeping. The rather large white scales are wholly without arrangement and appear as if sifted thickly over the surface.

IV. Xanthus Dietz, 1891. (Gr., "yellow.")

Beak long, rather slender, nearly straight, slightly widened

at tip, its grooves straight, reaching the eyes; antennæ inserted two-fifths, male, one-half, female, from apex; funicle 7-jointed (Fig. 78, *b*), first joint stout, second and third subequal, 3—7 transversely rounded; pygidium visible; front and middle tibiæ with a very small hook, hind ones with a feeble spine.

KEY TO SPECIES OF XANTHUS.

a. Reddish-brown; thorax densely punctured; pubescence conspicuous. 396. PYGMÆUS.

aa. Pale brownish yellow; thorax sparsely punctured; pubescence very fine. 397. LILIPUTANUS.

396 (11,043). XANTHUS PYGMÆUS Dietz, 1891, 269.

Elongate, subovate. Rufo-testaceous, pubescence white and rather long, especially on thorax which is feebly rounded on the sides, coarsely and densely punctured. Elytra slightly wider behind the middle, striæ feebly impressed, their punctures elongate and rather distant; intervals feebly convex, finely wrinkled, irregularly punctate. Front thighs armed with a very small tooth. Length 1.5—1.8 mm.

Anglesea, N. J., May 28. Piney Point, Md. Occurs on juniper, (*Ulke*); on the flowers of holly (*Wenzel*).

397 (11,044). XANTHUS LILIPUTANUS Dietz, 1891, 270.

"Smaller, elongate-oblong, subdepressed. Pale testaceous, very sparsely clothed with fine, whitish pubescence; otherwise very similar to *pygmæus*. Beak very sparsely punctured, shining. Thoracic punctures smaller and less dense. Elytra elongate, sides feebly rounded from humerus to apex, striæ fine, punctures small. Tooth of front femora very small, broadly triangular. Length 1.5 mm." (*Dietz.*)

Described from the District of Columbia.

V. ORCHESTES Ill., 1804. (Gr., "the jumper.")

Rather broad, somewhat depressed species having the eyes large, almost meeting in front; first three joints of funicle elongate, the others shorter, rounded; hind femora usually much thickened, fitted for leaping (Fig. 18, B); thorax relatively small; elytra oval or elongate-oval, wider than thorax, transversely impressed on basal third, humeri rounded; beak lying between the front legs in repose. The species are mostly leaf-miners on willow. *O. armatus* Dietz is *Psomus politus* Casey, according to Fall (1913, 64), who has studied the types.

KEY TO EASTERN SPECIES OF ORCHESTES.

a. Funicle of antennæ 7-jointed; form short, broad.

b. Elytra with pattern of pale pubescence.

c. Front and hind transverse pale band of elytra conspicuous.

d. Legs partly red; front band wide. 398. EPHIPPIATUS
dd. Legs black; front band narrower. 399. SALICIS.
cc. Elytra with only a faint pale transverse band on basal third. 400. NIGER.
b. Elytra black, with uniform whitish pubescence. 401. ILLINOISENSIS.
aa. Funicle 6-jointed; form narrower, more elongate.
e. Hind femora strongly thickened; larger, 2.5—3.5 mm.
f. Body wholly black; (reddish in *var. pallidior.*)
g. Thorax not wider than long, the intervals between its punctures very narrow, ridge-like, not alutaceous; elytral intervals and punctures coarsely rugose. 402. PALLICORNIS.
gg. Thorax distinctly wider than long, sides more rounded, the intervals between the punctures flatter and alutaceous.
h. Pubescence long, rather dense, conspicuous, with spots of more sparse, pale brownish hairs on elytra. 403. CANUS.
hh. Pubescence short, sparse, inconspicuous, evenly distributed over the elytra, the latter shining, without brownish spots. 404. MIXTUS.
ff. Elytra and abdomen red. 405. BETULETI.
ee. Hind femora scarcely thickened; black, legs, red; smaller, 1.8—2 mm. 406. RUFIPES.

398 (8678). ORCHESTES EPHIPPIATUS Say, 1831, 16; ibid, I, 280.

Broadly oval, subdepressed. Piceous-black; thorax thinly clothed with yellowish or grayish hairs; scutellum white; elytra with a large irregular triangular space on basal half and a narrow subapical band, the two connected on second interval, densely clothed with silvery white and pale brown hairs; antennæ, tibiæ, tarsi and usually the beak and front and middle femora, pale reddish-brown; hind femora in part or wholly piceous. Beak stout, shorter than head and thorax, cylindrical, feebly curved. Thorax slightly broader than long, sides feebly curved, disc finely and densely rugosely punctate. Elytra oval, at middle nearly twice as wide as thorax, finely striate; intervals flat. Length 2.5—3 mm.

Lake, Steuben and Posey counties, Ind., scarce; May 16—June 30. Bloomfield and Westville, N. J. Batavia, N. Y.; May 22—Sept. 19. Ranges from Quebec and New England to California, south to District of Columbia. Taken in abundance on the crack willow, *Salix fragilis* L., at Staten Island, N. Y. The beak is black in three of the eight specimens at hand, and the front spot or band of elytra is in part pale brown in all.

399 (8679). ORCHESTES SALICIS Linn., 1758, 381.

Similar to the preceding but smaller and less robust. Black, feebly shining; antennæ and tarsi reddish-brown, club dusky; front elytral band narrower, about one-third from the base, irregular, prolonged along the suture to the scutellum in front and extending back along the second interval, but not connected with the posterior transverse band which is narrow and angulated. Thorax one-half wider than long; apex much narrower than base, disc sparsely and finely punctured. Elytra oblong-oval, two-thirds wider at base than thorax, sides feebly curved; striæ coarsely punctured, intervals slightly convex. Length 2—2.5 mm.

Starke County, Ind., rare; May 9. Newark, N. J. Ranges from Newfoundland, Ontario and New Jersey to California, south to District of Columbia. Occurs also in Siberia and Europe. Found on willow when in bloom. This is the *O. subhirtus* of Horn.

400 (8677). ORCHESTES NIGER Horn, 1873, 462.

Elongate-ovate, subdepressed. Black, above thinly clothed with nearly black, prostrate hairs; antennæ piceous; scutellum densely white pubescent and conspicuous; elytra with a faint transverse fascia about one-third from base, consisting of sparse white pubescence; beneath clothed with similar pubescence. Beak cylindrical, as long as head and thorax, rather sparsely and coarsely punctate. Thorax one-third wider than long, sides moderately curved, disc coarsely, deeply and rather densely punctate. Elytra one-half wider at base than thorax, sides broadly curved from base to apex; striæ wide, deep, rather coarsely punctate; intervals flat, finely punctulate. Length 2—2.8 mm.

Lake, Starke and Warren counties, Ind., scarce; May 9—Oct. 14. Portage and Batavia, N. Y.; May 17—Aug. 6. Near New York City in June. Ranges from Nova Scotia and New England to Michigan, south to District of Columbia. Occurs on low willows.

401 (——). ORCHESTES ILLINOISENSIS Fall, 1913, 64.

"Black, lustre dull, pubescence whitish, rather long and conspicuous, recumbent, dense on the scutellum. Antennal funicle 7-jointed, in great part rufo-testaceous, club piceous. Thorax one-half as wide as elytra, sides parallel in basal two-fifths, hind angles nearly rectangular, punctuation dense, moderately coarse. Elytra elongate-oval, scarcely impressed; striæ distinctly impressed, intervals somewhat rugose. Length 2.4 mm." (*Fall.*)

Algonquin, Illinois; northern Illinois. Resembles *pallicornis* but the latter has the funicle 6-jointed.

402 (8673). ORCHESTES PALLICORNIS Say, 1831, 16; ibid, I, 280.

Elongate-oval, humeri prominent. Black, shining, sparsely clothed with very short grayish-yellow hairs; antennæ and tarsi reddish-brown; club dusky. Beak stout, scarcely as long as head and thorax, coarsely and sparsely punctate. Head finely granulate, sparsely and coarsely punctured. Thorax as broad at middle as long, sides feebly rounded, disc coarsely, very densely and shallowly punctured. Elytra oblong-oval, at base two-thirds wider than thorax, striæ feebly impressed, their punctures coarse; intervals flat, coarsely rugose, sparsely and finely punctate. Length 2.5—3. mm. (Fig. 80.)

Frequent throughout Indiana; described from Posey County;

Fig. 80. The apple flea-weevil, × 10. (After Forbes.)

May 11—June 25. Attacking cherry leaves in Knox County, June 10. Several localities in New Jersey and Staten Island; May—June. Ranges from Nova Scotia and Quebec through New England to Oregon, south to Texas. Occurs with *niger* on the leaves of low willows (*Chittenden*); on *Amelanchier* flowers, April 27, (*Frost.*) Mines the leaves of elm and alder, each larva making a separate mine and pupating in a cocoon in an inflated portion of the mine. (*Pierce.*)

Under the name of *O. canus* this species was called by Forbes the "apple flea-weevil," the larvæ making winding burrows in apple and cherry leaves, pupating within the leaf, the adults also feeding on the leaves, making numerous shallow pits which later become small holes. In southern Illinois 58 mined leaves were counted on a branch three feet long. The adults hibernate, the eggs being laid soon after the leaves open, the new brood appearing in May and June.*

402-a (——). ORCHESTES PALLICORNIS PALLIDIOR var. nov.

Similar to *pallicornis* except the color, which is entirely pale reddish, except as to the sterna, which are black, and the abdomen, which is of a darker red than the upper surface and sometimes blackish. Length 2.2—2.5 mm. (*C. W. L.*)

Taken in the peninsula of Avalon, Newfoundland, in July by W. S. Genung.

403 (8674). ORCHESTES CANUS Horn, 1878, 620.

Elongate-oval. Black, rather thickly clothed with long, gray, prostrate hairs; elytra each with a large faint, irregular, semi-denuded spot of brownish hairs in front of middle and a similar postmedian common one across the suture; antennæ and tarsi dark reddish-brown. Beak as long as head and thorax, rather coarsely and sparsely punctate. Thorax one-half wider than long, sides broadly rounded, narrowed and feebly constricted near apex; disc coarsely and closely punctured and with a vague median lengthwise impression. Elytra elongate-oval, sides parallel from humeri to near middle, then gradually converging to apex; striæ rather deep, coarsely and closely punctate, intervals each with two irregular rows of rather coarse punctures. Under surface finely and rather sparsely punctate. Length 2.8—3 mm.

*Twenty-sixth Rep. Nox. Ins. Ill., 1911, 83.

Fall River, Mass.; May 30. Isle Royale, Lake Superior, July 30. Recorded also from Michigan, Ohio and Colorado. The elytra are proportionally longer and the pubescence much more conspicuous than in either the preceding or the next species.

404 (——). ORCHESTES MIXTUS sp. nov.

Slightly shorter and more convex than *pallicornis*. Black, shining, more sparsely clothed with even finer, shorter grayish hairs than in that species; antennæ and tarsi reddish-brown. Beak stout, slightly longer than thorax, finely carinate and with regular rows of small elongate punctures. Head coarsely punctate as there. Thorax at middle one-third wider than long, sides parallel from base to middle, then rounded and converging to apex; disc with a faint median basal impression and rather coarse, round, shallow punctures, less dense than in *pallicornis*, their intervals alutaceous. Elytra elongate-oval, one-half wider at base than thorax, humeri rounded, not prominent; sides very broadly and feebly curved from base to apex; first and second striæ deep, the other more shallow, all with rather small, deep, close-set punctures; intervals feebly convex, very finely and sparsely punctate. Length 2.5—2.8 mm. (*W. S. B.*)

Martin and Posey counties, Ind., scarce; May 16—June 4. Differs from *pallicornis* in its finer, paler and shorter vestiture, wider thorax, more shining and much smoother elytra.

405 (8680). ORCHESTES BETULETI Horn, 1885, 161.

Elongate-oval. Black, elytra and abdomen bright red, antennæ and tarsi pale yellow; scutellum black; pubescence sparse, almost imperceptible. Beak coarsely punctured, smoother near base. Thorax wider than long, much narrower in front, coarsely and sparsely punctate. Elytra oval, one-third longer than wide, striæ coarsely and closely punctate; intervals flat, finely punctulate. Length 2.8—3 mm.

Known only from Maryland and District of Columbia. Occurs on the river birch, *Betula nigra* L., in late autumn and throughout the winter. (*Schwarz.*)

406 (8676). ORCHESTES RUFIPES Lec., 1876, 208.

Elliptic; smaller and less robust than any of the others. Black, opaque, thinly pubescent with fine grayish hairs; scutellum white; antennæ and legs pale reddish-yellow; hind femora more or less piceous. Beak stout, shorter than head and thorax, finely and sparsely punctate. Thorax subcylindrical, as long as wide, finely and closely punctate. Elytra oval, deeply striate, intervals minutely punctate. Length 1.8—2 mm.

Batavia, N. Y.; abundant on the shining willow, *Salix lucida* Muhl.; the adults feeding on the leaves, July 1—15, the larvæ mining the leaves in August and September. Other species of willow in the same locality were not infested by the beetle. (*H. H. Knight.*) Known also from Quebec, Newfoundland, Vermont and Massachusetts.

VI. Elleschus Stephens, 1831.

Small, elongate species having the beak short, robust, cylindrical, nearly straight, its antennal grooves wide and deep, directed against the lower border of eyes; funicle 7-jointed, club oval, pubescent; ventral segments unequal, third and fourth short, united equal to second, fifth long, rounded, carinate near tip in the males (Fig. 79, *f*); tibiæ with strong claws at apex, femora not toothed, the hind ones not greatly enlarged; tarsal claws appendiculate. The *E. angustatus* of Dietz, described from Kentucky and Arizona, is, according to Fall, only a variety of *Dorytomus squamosus* Lec.

KEY TO SPECIES OF ELLESCHUS.

a. Elytra each with an isolated denuded spot or fascia.
b. Pitchy black, the fascia faint; second joint of funicle longer than third. 407. BIPUNCTATUS.
bb. Reddish-brown; elytra fasciate and vittate (Fig. 81, *a.*); second joint of funicle equal to third. 408. SCANICUS.
aa. Elytra with a common denuded fascia, crossing the suture just behind the middle; reddish-brown, thickly clothed with pale yellowish hairs. 409. EPHIPPIATUS.

407 (8682). Elleschus bipunctatus Linn., 1758, 380.

Elongate-oval. Piceous-brown, rather densely clothed with coarse, appressed, grayish hairs, diverging from a median line on thorax; elytra each with a faint, irregular partly denuded spot behind the middle, reaching from the second to fourth interval; antennæ and legs reddish-brown. Beak shining, shorter than head and thorax, finely and sparsely punctate. Thorax one-half wider than long, widest at middle, sides feebly rounded, disc finely and densely punctate and with a faint smooth elevated line on middle third. Elytra at base one-half wider than thorax, sides nearly parallel for three-fifths their length, thence gradually rounded to tip; striæ fine, their punctures coarse, close-set; intervals feebly convex, minutely punctate. Length 3 mm.

Starke County, Ind., frequent locally on a dwarf willow; May 9. Snake Hill, N. J. A European species known also from Canada and Michigan. Occurs on willow when in blossom. (*Harrington.*)

408 (11,039). Elleschus scanicus Payk, 1800, 251.

More robust than *bipunctatus*. Reddish-brown, clothed with grayish-white or brownish pubescence; elytra with an irregular oblique fascia about the middle, extending from the second interval to the sides, third, fourth and sixth intervals for a short distance near the base and also a subapical spot, almost denuded, very thinly covered with fine brownish pubescence. Thorax finely, not densely punctured, the median smooth line

almost entire. Elytra oval, one-third wider at base than thorax; intervals nearly flat. Tarsi very stout, the tooth of claws large, broad, triangular. Length 2.7—3.3 mm. (Fig. 81 *a*).

A European species found near Plainfield, N. J. Hamilton (1894, 404; 1895, 376) also records it as abundant on willow at Hazelton and Allegheny, Pa.

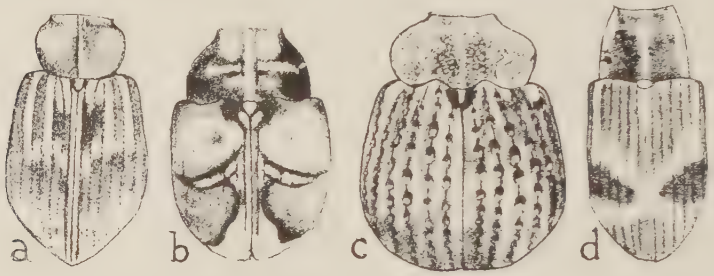


Fig. 81. *a*, *Elleschus scanicus* Payk; *b*, *Anthonomus elegans* Lec.; *c*, *A. julichi* Dietz; *d*, *A. elongatus* Lec. (After Dietz.)

409 (8683). ELLESCHUS EPHIPPIATUS Say, 1831, 25; ibid, I, 293.

Elongate, subcylindrical. Reddish-brown, clothed with pale yellowish and fawn-colored pubescence; elytra with a large dark scutellar spot and another somewhat rhomboidal one behind the middle, the two usually connected along the suture; scutellum pale. Beak shorter than head and thorax, finely, sparsely punctate. Thorax at middle one-half wider than long, sides feebly rounded, disc finely, not densely punctate. Elytra elongate-oval, at base nearly one-half wider than thorax; striæ fine, their punctures large, close-set; intervals flat. Length 1.8—3.3 mm.

Frequent throughout Indiana; March 28—June 3. Occurs on willow; mating May 13. Sanford, Fla., April 4. Ranges throughout the United States and Canada. Extremely variable in size, shape and hue of the dark spots on elytra. Bred by Walsh from the galls of *Rhabdophaga strobiloides* O. S. on willow.

VII. MACRORHOPTUS Lec., 1876. (Gr., "long" + "club.")

Beak stout, cylindrical, densely scaly, nearly straight, as long as thorax, wider than the front; antennal grooves deep, oblique, directed beneath the eyes; antennæ rather short, stout, funicle 6 jointed, first joint short, robust, second slightly longer than third, 2—6 gradually wider, closely connected, the sixth united with club (Fig. 78, *h*); prosternum short, emarginate in front; third and fourth ventral segments united one-third longer than second; front femora armed with a long triangular tooth; tibiæ all with a small hook at apex.

410 (8681). MACRORHOPTUS ESTRIATUS Lec., 1876, 209.

Elongate-oblong. Black, rather densely clothed with elongate, ash-gray scales; antennæ and legs reddish-brown. Thorax wider than long, sides

nearly straight behind, rounded in front, hind angles rectangular; disc deeply, coarsely and densely punctate. Elytra oblong, very little wider at base than thorax; sides almost parallel, tips broadly conjointly rounded; striæ almost obsolete, disc densely punctured, each puncture bearing a scale. Length 2.5—3 mm.

Known from Illinois, Kansas, Oklahoma, Texas and California. Pierce (1907, 268) states that in Texas the eggs are laid in spring or early summer, in the seed capsules of a mallow, *Callirrhoe involucrata* Gray, causing a wart, the larvæ feeding between the two carpels and forming a cell in which pupation takes place. Taken also on the hollyhock, *Althæa rosea* Cav., and on the prairie clover, *Kuhnistera multiflora* Nutt.

VIII. TACHYPTERUS Dietz, 1891. (Gr., "swift" + "wing.")

Beak slender, feebly curved, as long as body, female, two-thirds as long, male; antennal grooves deep, linear, directed toward but not reaching the eyes; antennæ slender, inserted one-third from apex, male, just in front of middle, female, scape not reaching eyes; funicle 7-jointed (Fig. 78, *d*, *e*), first joint as long as the next four united, 2—7 short, club elongate, acuminate; abdomen broadly ovate, first and second ventrals rather long, subequal, third and fourth shorter, fifth longer; front femora two toothed, middle and hind ones with one tooth; all the tibiæ with a small hook at tip; claws cleft, the teeth convergent.

411 (8630). TACHYPTERUS QUADRIGIBBUS Say, 1831, 15; ibid I, 277.

Ovate, convex. Dark red, beak, antennæ and legs paler; thorax and basal half of elytra thinly clothed with hoary pubescence; thorax with three lines of white pubescence; beneath the sides of sterna with a stripe of dense yellowish hair. Thorax conical, base one-half wider than long, nearly twice as wide as apex, disc densely and coarsely punctate. Elytra transversely impressed behind the scutellum, each with a large tubercle on third interval at declivity and another on fourth interval nearer the apex. Length 3—4.5 mm. (Fig. 82.)

Abundant throughout Indiana; May 11 -June 25. Beaten from flowers of the red haw, *Cratægus*, and leaves of hazel. Common near New York City, April to August, on shadbush, *Cratægus* and fruit trees. Ranges over the entire United States and Canada. Known as the "apple curculio," the larvæ feeding around the core of apple, pear and haw, but rarely very injurious. (*Smith.*)

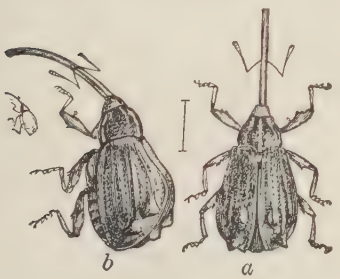


Fig. 82. The apple curculio. × 5. (After Riley.)

IX. Anthonomopsis Dietz, 1891. (Gr., "Anthonomus-like.")

Beak slender, cylindrical, punctured, strongly striate, about as long as head and thorax, male, one-third longer, female; antennæ stout, funicle 6-jointed, first joint stout, as long as the next two, second slightly longer than third; abdomen flattened, first ventral longer than the metasternum, second nearly as long, 3—5 relatively short, subequal (Fig. 79, *c*); pygidium feebly exposed at tip in male, wholly concealed, female; all the tibiæ hooked at apex. One species, usually listed under *Anthonomus*, forms the type of the genus.

412 (8667). Anthonomopsis mixtus Lec., 1876, 206.

Elongate-ovate. Reddish or pitchy brown, thinly clothed with coarse, variegated pubescence; elytra with a humeral and a large discal spot behind the middle paler; a transverse band before the middle, another on the discal spot and a third near apex of dense, whitish pubescence; antennæ and legs reddish-brown, club and tip of beak fuscous. Head with a deep frontal fovea. Thorax smaller than usual, narrowed from the base, constricted near apex, disc densely and coarsely punctured. Scutellum white, pubescent. Elytra about one-fourth wider at base than thorax, gradually feebly widened behind to middle; striæ coarsely punctured; intervals wide, slightly convex, nearly smooth. Femora all armed with a small tooth. Length 2.5—3.2 mm.

Posey County, Indiana, rare; May 11. On the Atlantic coast the records are not numerous. Litchfield, Connecticut, August 20. New Jersey, July; on the cockspur thorn, *Crataegus crusgalli* L. Beaten abundantly from wild plum in Ohio. (*Dury.*) Ranges from Connecticut to Iowa and Nebraska, south to Missouri and Texas.

X. Nanops Dietz, 1891. (Gr., "small" + "eye.")

Beak as long as thorax, robust, cylindrical, curved; antennæ inserted at middle, scape short, funicle 6-jointed (Fig. 78, *k*), first joint long and stout, second slightly longer than third; club ovate, loosely jointed; legs rather short and stout; femora not toothed; all the tibiæ with a small hook at tip.

413 (11,031). Nanops schwarzii Dietz, 1891, 256.

Elongate, narrow, subparallel. Pitchy brown, sparsely clothed with rather long, white pubescence which, on the elytral intervals, arises from a single row of fine punctures; elytra a little darker along the suture. Beak alutaceous, neither punctured nor striate. Head impunctured, alutaceous Thorax scarcely narrower in front than at base, sides rounded, disc moderately, not closely punctured. Elytra elongate, scarcely wider at base than thorax; striæ impressed, their punctures rather remote. Length 1.4 mm.

Described from Florida. Northward it has been reported to occur at Buena Vista, N. J.

XI. ANTHONOMUS Germ., 1821. (Gr., "flower" + "to feed on.")

As restricted by Dietz this large genus is characterized as follows: Beak variable, generally long and slender; antennal grooves long, directed against the eyes; antennæ variable, scape reaching the eye or nearly so, funicle 6- or 7-jointed; club elongate-ovate; elytra distinctly striate and punctured, their tips rounded, leaving the pygidium, at least in the male, more or less exposed; prosternum short in front of coxæ; femora generally toothed; front and middle tibiæ with a hook, hind ones with a spine at tip. For convenience we class our eastern representatives of the genus under six groups or subgenera as follows:

KEY TO EASTERN SUBGENERA OF ANTHONOMUS.

a. Fifth ventral of male short, deeply and broadly emarginate (Fig. 79, *a*); pygidium of male perpendicular; length 5—6 mm.
Subgenus I. COCCOTORUS, p. 287.

aa. Fifth ventral of male not or only feebly emarginate.

b. Ventral segments 1—4 short, fifth longer in the male, first short behind the coxæ; upper surface scaly; length less than 2.5 mm.
Subgenus II. ANTHONOMOCYLLUS, p. 288.

bb. First ventral not short behind the coxæ.

c. Funicle 7-jointed.

d. Pygidium with a deep longitudinal groove.
Subgenus III. PARANTHONOMUS, p. 290.

dd. Pygidium convex, not grooved.

e. Club strongly elongate, its joints loosely articulate (Fig. 78, *f*); form robust; color mainly reddish-brown.
Subgenus IV. LEPTARTHRUS, p. 291.

ee. Club elliptic or ovoidal, not very loosely articulate.
Subgenus V. ANTHONOMUS, p. 292.

cc. Funicle 6-jointed. Subgenus VI. SEXARTHRUS, p. 311.

SUBGENUS I. (*Coccotorus.*)

Beak as long as head and thorax, nearly straight, cylindrical, slightly widened at tip, carinate above, striate each side, coarsely reticulately punctured, male, very finely punctured beyond the antennæ, female; funicle 7 jointed, first joint as long as the next three, second longer than third; eyes small, round, prominent; front deeply foveate; femora strongly toothed; front tibiæ bisinuate beneath.

414 (8629). ANTHONOMUS SCUTELLARIS Lec., 1858, 79.

Oblong, convex. Dark reddish-brown, beak, antennæ and legs paler; base of beak, head, thorax and narrow sutural stripe densely clothed with

long fulvous hair; scutellum yellowish pubescent; elytra mottled with patches of fine grayish hair. Thorax wider at base than long, sides nearly parallel from base to middle, then strongly converging to apex; disc densely and coarsely punctate. Elytra oblong, striæ very narrow, finely punctate; intervals wide, flat, the third and fifth with small tufts of semi-erect, seal-brown hairs at base. Length 5—6 mm. (Fig. 83.)

Lake and Posey counties, Ind., scarce; May 12—28. Near New York City it occurs on the beach plum, *Prunus maritima* Wang., in May and was bred from it by Zabriskie. It also wanders to other shrubs and has been found on oak catkins near beach plums at Lakehurst, N. J. Ranges from Massachusetts and New Jersey to Kansas, south to Georgia and Texas. Known as the "plum gouger," breeding in the wild and cultivated plum, the egg being laid near the surface and the larva eating its way in through the flesh, pupating in the pit or kernel. Occurs also in apple. (*Riley.*) *A prunicida* Walsh is a synonym.

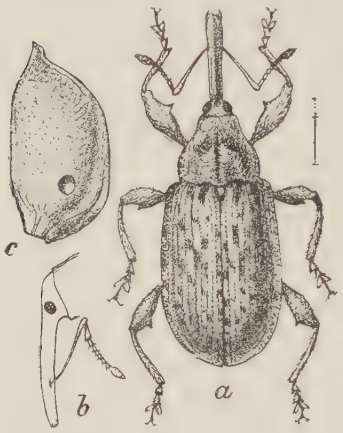


Fig. 83. The plum gouger. *a*, Plum-stone showing exit hole of larva; *b*, adult beetle, × 6; *c*, side view of head. (From Insect Life.)

Anthonomus (*Coccotorus*) *hirsutus* Brun., feeds on the sand cherry, *Prunus pumila L.*, in Nebraska, and as that plant occurs along the south shore of Lake Michigan, the beetle may occur in northern Indiana. It differs from *scutellaris* in having the beak more slender, longer than head and thorax; second joint of funicle shorter, but little longer than third; thorax and elytra more coarsely pubescent.

SUBGENUS II. (*Anthonomocyllus.*)

Beak long, slender, feebly curved, striate, carinate above; funicle 7-jointed, first joint as long as the next two; club rather loosely articulate, sparsely pubescent; eyes small, convex; front femora armed with a large acute tooth. The males have the pygidium convex, perpendicular, and more strongly exposed, prosternum very short, ventral segments 1—4 short, nearly equal, fifth twice as long, feebly emarginate; hind tibiæ curved. In the female the ventral segments are all short, subequal, and hind tibiæ nearly straight.

KEY TO EASTERN SPECIES OF SUBGENUS ANTHONOMOCYLLUS.

a. Eyes protuberant, narrowly separated above; surface densely clothed with variegated scales. 415. ELEGANS.

aa. Eyes feebly convex, widely separated above; surface thinly clothed with whitish scales.

b. Form broadly oval; color pale reddish-brown; length 1.5—2.2 mm.

c. Elytra without a pale basal spot and denuded area; length 1.5—2 mm. 416. PUSILLUS.

cc. Elytra with an elongate basal spot of pale scales on fifth interval and a partially denuded area behind the middle; length 2.2 mm. 416-a. var. HAMILTONI.

bb. Form oblong-oval; color dark chestnut brown; length 1—1.2 mm. 417. ATOMARIUS.

415 (8651). ANTHONOMUS ELEGANS Lec., 1876, 202.

Rather broadly ovate. Dark brown, densely clothed with small scales, variegated in silvery white, gray, buff and brown on the upper surface and grayish-white intermixed with brown beneath; beak, antennæ and legs reddish-brown. Thorax as wide as long, sides feebly rounded; disc strongly and suddenly narrowed in front of middle and constricted near apex, densely punctured. Elytra wider at base than thorax, humeri prominent, rounded; striæ fine, the sculpture concealed by the scales. Length 2—2.5 mm. (Fig. 81, *b*.)

Haulover, Fla.; very rare on oak shrubs; March 10 (*Schwarz*). Jupiter and Biscayne Bay, Fla.; LeConte collection. "The thorax is marked with two lines of white scales, forming a cross, and the scales of elytra form a beautiful complex pattern of brown, dark brown and gray." (*LeConte.*)

416 (8650). ANTHONOMUS PUSILLUS Lec., 1876, 202.

Broadly oval, convex. Reddish-brown, thinly clothed with white hair-like scales, more densely on sides of thorax; beak and legs paler; scutellum white. Beak slender, as long as head and thorax, scaly at base, sparsely and finely punctured. Second joint of funicle scarcely longer than third. Thorax at base more than one-half wider than long, sides feebly curved, disc strongly narrowed near apex, coarsely, deeply and rather densely punctured. Elytra short, oval, one-fourth wider at base than thorax, sides broadly rounded; striæ coarsely and rather distantly punctate; intervals wide, flat, finely wrinkled. Femora stout, acutely toothed, the hind ones minutely so. Length 1.5—2.2 mm.

Occurs at several localities in New Jersey and New York. Ranges from Lowell, Mass., to Florida and Texas. Breeds in the seeds of frost weed, *Helianthemum canadense* L. (*Blanchard.*) The above is the description of the male, the type being from Texas. The female, as recognized by Blanchard, is much larger, paler in color, with the scales more dense and second joint of funicle nearly twice as long as third.

416-a (10,976). ANTHONOMUS PUSILLUS HAMILTONI Dietz, 1891, 193.

Larger and paler reddish-brown; scales more yellowish, somewhat larger on the thorax and under side of body and intermixed with fine, semiprocumbent pubescence, condensed to form a pale oblong spot on base of fifth interval and two undulating cross-bars, enclosing a partially denuded area on elytra. Second joint of funicle twice as long as third. Length 2.2 mm.

Described from Florida. Fall (1913, 46) states that he "should have little hesitancy in uniting it with *pusillus*."

417 (——). ANTHONOMUS ATOMARIUS sp. nov.

Oblong-oval, convex. Dark reddish or chestnut brown, thinly clothed with white, elongate scales; antennæ (except club), tibiæ, tarsi and base of femora paler; head piceous. Beak scarcely as long as head and thorax, male, slightly longer, female, very finely carinate, glabrous, minutely and sparsely punctate; antennæ inserted at apical third, male, at middle, female; funicle 7-jointed, first joint robust, twice as long as second, 2—6 short, wider than long, subequal, seventh slightly longer and wider. Thorax one-half wider than long, slightly narrowed in front, sides feebly curved; disc rather coarsely, deeply not densely punctate. Elytra oblong-oval, scarcely wider at base than thorax, sides parallel to apical third, then broadly rounded to apex; striæ with rather coarse punctures separated by their own diameters; intervals feebly convex. Length 1—1.2 mm. (*W.S.B.*)

Ocean Co., N. J.; numerous specimens in Leng collection; swept from an oak shrub. Our smallest species of the genus. The scales of elytra are arranged rather regularly along the intervals and are not condensed on scutellum or humeri.

SUBGENUS III. (*Paranthonomus.*)

Beak cylindrical, rather slender, punctured, carinate and striate; antennal grooves straight, deep, directed toward the middle of eyes; head conical, punctured, front foveate; antennæ slender, inserted not more than one-third from apex; funicle 7-jointed, first joint long, second shorter, twice as long as third; ventral segments of male unequal, fifth nearly twice as long as either third or fourth and with a smooth, semicircular spot at tip; of female, nearly equal; pygidium exposed, perpendicular and with a deep, sharply defined longitudinal excavation; femora clavate, strongly toothed.

KEY TO SPECIES OF SUBGENUS PARANTHONOMUS.

a. Larger, 3.2—3.7 mm.; thorax very coarsely and less densely punctured; pubescence of white hairs very sparse, the black hairs very few. 418. PROFUNDUS.

aa. Smaller, 2.2—2.5 mm.; thorax more finely and densely punctured; pubescence more conspicuous, the black hairs more evident. 419. RUBIDUS.

418 (8634). ANTHONOMUS PROFUNDUS Lec., 1876, 198.

Ovate, convex. Reddish-brown, feebly shining; head, club of antennæ, femora and under surface more or less piceous; thorax with a median line of pale pubescence; scutellum yellowish white. Head with a frontal fovea. Thorax as long as wide, sides nearly straight from base to beyond middle, then narrowed and constricted to apex. Elytra one-fourth wider than thorax; striæ deep and wide, with elongate, close-set punctures; intervals convex, finely wrinkled and punctulate. Length 3.2—3.7 mm.

Frequent in northern Indiana, less so in the southern counties; May 5—October 14. Beaten from oak. Found near New York

City in June on huckleberry blossoms. Ranges from Quebec and New York to Iowa, south to Kentucky and Maryland. Lives in the buds of *Crataegus crus-galli* L., developing within the fruit, the imago appearing in July. (*Schwarz.*) Easily known by the deep median groove of pygidium, size, color and deep elytral striæ.

418-a (10,982). ANTHONOMUS PROFUNDUS VULPINUS Dietz, 1891, 201.

Smaller and paler. First and second joint of funicle relatively shorter, the second scarcely half the length of the first. Thorax shorter, less than one-half wider than long, sides more rounded, disc less rugosely punctate. Elytral intervals less convex. Length 2.7 mm.

Described from Pennsylvania. Fall (1913, 46) considers it the same as *profundus*, but the types at Cambridge show differences sufficient to justify at least a varietal name.

419 (8639). ANTHONOMUS RUBIDUS Lec., 1876, 199.

Oblong-oval. Brownish-yellow, rather densely clothed with yellowish pubescence, condensed on median line of thorax and scutellum, intermixed on elytra with fine blackish hairs; apical half of antennæ, suture and region of scutellum dusky; under surface piceous. Thorax one-third wider than long, sides rounded from the base, feebly constricted near apex; disc densely and finely punctured. Elytra oblong, at base one-fourth wider than thorax; striæ deep, punctured; intervals convex, finely punctate. Front femora with two teeth. Length 2.2—2.5 mm.

Described from Pennsylvania. Recorded also from Ontario, Deer Park, Md., and District of Columbia. Easily known by its pale color, small size, very convex eyes and the additional tooth of front thighs.

SUBGENUS IV. (*Leptarthrus.*)

Antennæ slender, funicle 7-jointed, first and second joints longer; club greatly elongated, very loosely jointed (Fig. 78, *f*); pygidium exposed in both sexes; front legs longer and stouter than the others; femora strongly toothed. (Fig. 79, *j.*) Two species are known.

KEY TO SPECIES OF SUBGENUS LEPTARTHRUS.

a. Larger, 4.3—5 mm.; front tibiæ not toothed on the inner side; elytral punctures very large. 420. JULICHII.

aa. Smaller, not over 3.5 mm.; front tibiæ toothed on inner side (Fig. 78, *g*); elytral punctures much smaller. 421. COSTULATUS.

420 (10,980). ANTHONOMUS JULICHII Dietz, 1891, 198.

Subovate, robust. Reddish-brown, clothed with pale yellowish pubescence, fine and sparse on the elytra, much coarser and denser on the thorax and front femora; scutellum and two basal spots on elytra more densely pubescent. Thorax nearly twice as wide as long, strongly narrowed in front; base deeply bisinuate, sides strongly rounded, apex scarcely constricted, disc coarsely and rather densely punctured. Elytra broadly oval, very convex, slightly wider at base than thorax; striæ fine, their punc-

tures very large, remote; intervals convex, with small, scattered shining tubercles. Length 4.3—5 mm. (Fig. 81, *c*.)

Described from Metacumbe Key, Florida.

421 (10,981). ANTHONOMUS COSTULATUS Suffr., 1871, 137.

Oval, robust. Dark reddish-brown to piceous, rather densely clothed above with minute yellowish or fulvous scales, elytra mottled with patches or lines of paler and darker scales; under surface rather densely clothed with coarse white pubescence; thorax with a narrow median white line. Beak long, slender, opaque, slightly widened at tip, striate, punctured and thinly pubescent. Thorax two-thirds wider at middle than long, strongly narrowed in front, constricted near apex, sides rounded, disc deeply, densely and rather finely punctured. Elytra at base one-third wider than thorax, one-half longer than wide; striæ wide, their punctures rather large, transverse, close-set; intervals strongly convex, a small acute tubercle near base of third and a feeble tuberosity on fifth near declivity. Length 2.5—3.2 mm.

Lake Okeechobee, Fla., Mar. 6. Known also from Key West, Cocoanut Grove, Punta Gorda and Biscayne Bay, Fla. The toothed tibiæ easily separates this from *julichi*. *A. irroratus* Dietz (1891, 198) is a synonym.

SUBGENUS V. (*Anthonomus.*)

As here treated this subgenus comprises the eastern species of the first seven groups of the subgenus *Anthonomus* as limited by Dietz, or those having the antennal funicle 7-jointed. The principal characters are those given under the generic heading and in the key to subgenera. Dietz recognized 47 species from the United States as belonging to the seven groups, while Fall and Pierce have each since described a number of others.

KEY TO GROUPS OF SUBGENUS ANTHONOMUS.

a. Vestiture mainly of hairs or narrow hair-like scales; true scales, if any, arranged in spots or lines (except in *concinnus*.)

b. Claws with a long, strong tooth (except in *subguttatus*); upper surface distinctly pubescent.

c. Elytra conjointly rounded at apex; pygidium of male very little exposed; pubescence arranged in patterns on the elytra. GROUP A.

cc. Elytra not conjointly rounded at apex; pygidium, at least of male, more fully exposed; pubescence uniform, or condensed in spots or lines without pattern.

d. Front femora bidentate, the front tooth often very small. GROUP B.

dd. Front femora one-toothed.

e. Third ventral segment longer than fourth, fifth shorter, rarely as long as fourth in male. (Fig. 79, *b*., *c*.)

f. Elytra with pubescence uniform, rarely condensed in spots or lines, and without denuded patch or band. GROUP C.

ff Elytra with spots or lines of condensed pubescence, enclosing a denuded patch or band. GROUP D.

ee. Third and fourth ventrals equal or nearly so; fifth ventral of male longer than fourth. (Fig. 79, *d.*) GROUP E.

bb. Claws armed with a small, inconspicuous basal tooth; both upper and lower surfaces evenly pubescent. GROUP F.

aa. Vestiture of scales which clothe both the upper and lower surfaces; tarsi long. GROUP G.

GROUP A.

KEY TO SPECIES OF GROUP A.

a. Front femora with two teeth, connected at base; pubescence of scale-like hairs; form more robust. 422. NEBULOSUS.

aa. Front femora one-toothed (Fig. 79, *i.*); pubescence of slender hairs; form more slender. 423. POMORUM.

422 (8631). ANTHONOMUS NEBULOSUS Lec., 1876, 197.

Oval, robust. Dark reddish-brown to piceous; pubescence of rather coarse, scale-like hairs of a grayish-brown or fawn color, intermixed with very fine, short hairs, the pale ones forming on the elytra a broad V, its apex near middle of suture, its sides extending obliquely toward humeri and widened behind the latter; also a number of spots on apical half of disc. Scutellum yellowish-white. Beak longer than head and thorax, almost glabrous, finely carinate, rather coarsely punctate, sides each with two striæ. Antennæ slender, inserted one-third from apex, second joint of funicle twice as long as third, one-half the length of first. Thorax bell-shaped, at base three-fifths wider than long, narrowed in front, disc densely, deeply and rather finely punctured. Elytra oblong-oval, at base one-third wider than thorax, striæ with close-set punctures; intervals wide, feebly convex, finely punctulate. Length 3.7—4.2 mm.

Common throughout the northern half of Indiana, much less so in the southern counties; May 3—June 31. Beaten from flowers of *Crataegus* and foliage of oak. Batavia and Portage, N. Y.; May 24—July 5. Ranges from New York and Michigan to Missouri. Varies in the ground color from pale reddish-brown to almost black, and also in the pattern of elytral pubescence.

423 (10,984). ANTHONOMUS POMORUM Linn., 1758, 381.

Dark brown or piceous, clothed with yellowish-brown and grayish hairs, the latter forming a median and lateral stripes on thorax, an oblique band behind the middle and a triangular spot on the declivity of the elytra. Length 4 mm.

A common European species of which Dr. Dietz received a single female among some specimens of *nebulosus* from Ohio. Easily separated by the single tooth of the front femora. In Europe it is called the "pomacha," and breeds in the buds of apples, pears and cherries, causing them to drop.

GROUP B.

In this group the second joint of funicle is longer than third; pubescence coarse or sparse; ventral segments not very unequal, the fifth somewhat longer than either third or fourth; claws armed with a long slender tooth. Three species occur in our

territory; *rufipennis* here placed by Dietz, being transferred to the next group, the additional cusp mentioned by him, when present, being so small that one has to draw on the imagination to see it.

KEY TO SPECIES OF GROUP B.

a. Larger, 4—7.5 mm.; reddish-brown, clothed with coarse, pale yellowish pubescence; antennæ inserted two-fifths from apex of beak, female, one-third from apex, male. . 424. GRANDIS.

aa. Smaller, not over 3.5 mm.; pubescence fine and sparse above; antennæ inserted near the apex of beak.

b. Pitchy black; front tibiæ of male not curved inward and produced at tip. 425. GULARIS.

bb. Elytra and legs more or less reddish-brown; front tibiæ of male curved inward and produced at tip. (Fig. 79, *h*.) 426. VIRGO.

424 (10,985). ANTHONOMUS GRANDIS Boh., Schön., 1843, Pt. 2, 232.

Oblong-ovate, robust. Reddish-brown to piceous, clothed with coarse pale, yellowish scale-like hairs, more dense along the median line and on sides of thorax, somewhat condensed in numerous small spots on the elytra. Beak half the length of body, slender, shining, sparsely pubescent at base, striate and coarsely punctate on basal half of sides, finely and sparsely punctured near apex, female; one-fourth shorter, coarsely punctured throughout, male. Head conical, coarsely and sparsely punctate, front deeply foveate. Thorax one-half wider than long, sides almost straight from base to middle, strongly rounded in front; disc constricted and transversely impressed near apex, densely and coarsely punctate. Elytra oblong, one-fifth wider at base than middle of thorax, sides subparallel from base to apical third, thence gradually converging to tips which are separately rounded; striæ rather deep, punctures large, close-set; intervals feebly convex, rugose. Length 4—7.5 mm. (Fig. 84.)

Fig. 84. The cotton boll weevil, × 4. (After Hunter & Hinds.)

This is the "cotton-boll weevil" which entered Texas from Mexico about 1892 and has spread east and north as far as southwestern Tennessee, doing immense damage each year to the cotton crop, and "becoming the most serious menace that ever threatened any agricultural industry." The egg is deposited by the female in a cavity formed by eating into a young boll of cotton. After hatching, the larva feeds upon the pollen grains and tender tissues of the boll, and enlarges the cavity for a period of one to three weeks, the time depending upon the tem-

perature, meanwhile moulting two or three times. Hunter & Hinds (1905) state that the pupal stage is passed in the enlarged cavity and takes from four to 15 days. Where found in numbers, a half dozen or even more weevils may be developed in a single boll, which is completely destroyed by their feeding. The adults feed upon the squares or young bolls and also upon the leaves, and the damage which they do is as much or more than that of the larvæ. Both larvæ and adults hibernate, the latter attacking the young cotton early in the spring. Cotton is the only food plant and the spread of the beetles which takes place each fall will doubtless eventually cover the entire cotton growing area of the United States.

425 (8633). ANTHONOMUS GULARIS Lec., 1876, 197.

Elongate-oblong. Head, beak, thorax and under surface piceous; elytra usually dark reddish-brown, the suture fuscous; scape, first joint of funicle, and legs except the knees, pale reddish-brown; upper surface shining, finely and sparsely clothed with whitish pubescence, somewhat condensed near hind angles and along median line of thorax; scutellum, under surface of head and sternal side pieces densely clothed with yellowish pubescence. Beak shining, finely and remotely punctate, indistinctly striate; head opaque, finely and sparsely punctate, the frontal fovea small. Thorax convex, slightly wider at middle than long, sides straight on basal third, thence strongly rounded to near apex, disc densely and rather coarsely punctured. Elytra oblong, one-fourth wider at base than thorax; strial punctures small, feebly impressed; intervals wide, almost flat, nearly smooth. Length 3—3.5 mm.

Steuben Co., Indiana, rare; June 17. Ranges from Virginia and Maryland to Michigan and Cincinnati, Ohio. Schwarz states (1884, 84) that it oviposits in the flowers of the wild senna, *Cassia marylandica* L. Varies in color, the upper surface sometimes wholly, the legs in great part, black. The additional tooth of front femora is a very small acute cusp in front of the base of the main tooth.

426 (10,986). ANTHONOMUS VIRGO Dietz, 1891, 206.

"Resembles *gularis* in form and pubescence. Beak more densely punctured, less shining; median elevated line scarcely attaining the base; head opaque, densely and finely punctured; front with an impressed line. Thorax rufo-piceous. Elytra bright ferruginous, periscutellar space and suture dark piceous; front tibiæ fringed with hair along the inner margin; front tibiæ of male curved inward near apex, and the internal angle produced in the form of a broad hook (Fig. 79, *h.*); legs and abdomen along the middle ferruginous. Length 2.5—3.4 mm." (*Dietz.*)

Described from Cobb's Island, Va.

GROUP C.

Species not over 3 mm. in length, having at least the front and middle femora armed with a single tooth and the ventral segments decreasing in length from the second (Fig. 79, *b*); tarsi slender, the first joint longer than the second.

KEY TO EASTERN SPECIES OF GROUP C.

a. Nearly uniform reddish-brown, head and under side of thorax dusky; elytral intervals smooth; length 2.2 mm. 427. RUBELLUS.

aa. At least head, thorax and under surface, except abdomen, black or piceous.

b. Dark piceous or black, the elytra wholly or in part reddish; antennæ pale brownish-yellow.

c. Elytra and abdomen wholly reddish.

d. Intervals of elytra subopaque, nearly flat, densely and finely rugulose; thoracic punctures very coarse and dense. 428. SYCOPHANTA.

dd. Intervals of elytra shining, slightly convex, minutely and sparsely punctate; punctures of thorax finer, less crowded. 429. RUFIPENNIS.

cc. Elytra partly black, more shining. 430. SUTURALIS.

bb. Entirely pitchy brown or black.

e. Pubescence fine, sparse, inconspicuous above.

f. Elytra finely striate-punctate, shining; antennæ pale; thorax coarsely and rather sparsely punctate. 431. FLAVICORNIS.

ff. Elytral striæ deeply impressed, their punctures large, distant; intervals convex, shining. 432. CORVULUS.

ee. Pubescence coarse, conspicuous, forming spots or lines on elytra. 433. SUBGUTTATUS.

427 (10,988). ANTHONOMUS RUBELLUS Dietz, 1891, 208.

Oblong. Reddish-brown, thinly clothed with fine whitish pubescence. Beak slender, curved, finely carinate and punctate. Second joint of funicle scarcely longer than third, 3—7 not longer than wide. Thorax one-third wider than long, sides nearly parallel from base to middle, thence rounded and strongly constricted to apex; disc densely and coarsely punctured. Elytra subovate, two-fifths wider at base than thorax, sides feebly and broadly rounded to apex; strial punctures large, round, rather distant; intervals smooth, feebly convex. Pygidium almost concealed. Length 2.2 mm.

Described from a single female from Lake Superior.

428 (8641). ANTHONOMUS SYCOPHANTA Walsh, 1867, 265.

Rather broadly oblong-oval. Dark piceous, thinly pubescent, elytra and abdomen brick-red; antennæ brownish-yellow; legs either bright reddish brown or pitchy black, front thoracic margin and tip of beak often also reddish; scutellum and a small spot at base of sixth interval white. Beak rather stout, curved, as long as head and thorax, striate, finely and rather densely punctate, finely carinate above. Head sparsely and finely

punctate; frontal fovea small, deep. Thorax one-half wider than long, sides subparallel from base to beyond middle, thence strongly narrowed to apex. Elytra one-third wider at base than thorax, sides subparallel to apical third, then separately rounded to apex; disc shallowly striate, the strial punctures finer and more close-set than in the next; intervals almost flat, minutely wrinkled. Length 2.5—3 mm.

Lake County, Indiana, scarce; May 29—August 9. Many records near New York City, May, June and August. Rock City, N. J., June 10; abundant on laurel. (*Davis.*) Ranges from Canada and New England to Oregon and California on a line north of the Ohio River. Breeds in galls made by saw-flies on willow. (*Walsh.*) Although LeConte, Dietz and Fall have all expressed the opinion that this species is a synonym of *A. hæmotopus* Boh. (1843, Pt. 2, 222), yet none of them have seen Boheman's type, which was from Boston, and had the intervals of elytra "angustis, convexus, lævibus," a character which agrees far better with the next species than with this. We therefore retain the name by which it is best known until Boheman's type can be accurately determined.

429 (8642). Anthonomus rufipennis Lec., 1876, 200.

Oblong-oval. Piceous, elytra reddish-brown, a small scutellar space and the suture often slightly darker; antennæ and legs pale reddish-brown, club dusky. Beak striate and with several rows of remote punctures. Second joint of funicle elongate. Thorax scarcely one-fourth wider than long, broadly rounded on the sides, disc densely and rather coarsely punctured. Elytra oblong, striæ and punctures more strongly impressed than in *sycophanta*; intervals slightly convex, each with a few scattered minute punctures. Length 2.2—3 mm.

Marshall Co., Ind., May 21. South Orange, N. J. Dunedin, Fla., March 27 -May 26. Described from Pennsylvania. Ranges from New England and Canada to Wisconsin, south to Florida and Texas. Very close to *sycophanta* but form more narrow, thoracic punctures finer and intervals more convex and shining. The type does not show the second cusp or tooth mentioned by Dietz, nor is it present in any of the five specimens at hand.

430 (8643). Anthonomus suturalis Lec., J. E., 1824, 171.

Form and size of *sycophanta*. Pitchy black; apical half of elytra more or less reddish-brown, upper surface shining, thinly pubescent; tibiæ piceous, tarsi paler; scutellum with dense white pubescence. Thorax with sides more strongly rounded, and disc much less densely and more finely punctured. Elytral striæ not deeply impressed, their punctures small, rather distant; intervals flat, shining, finely rugose. Length 2.7—3 mm.

Frequent throughout Indiana; April 25—June 11; taken by sweeping. On hickory leaves, Framingham, Mass., May 30. Not

rare near New York City in June. Occurs throughout Canada, New England, the Southern, Middle and Western States. Found on wild plum (*Ulke*); said to attack cranberry, laying its eggs in the bud, the larva living in the fruit. (*Lugger.*) The red apical blotch varies in extent, but always leaves the suture and scutellar space black. *A. erythropterus* Say is a synonym.

431 (8646). ANTHONOMUS FLAVICORNIS Boh., Schn., 1843, Pt. 2, 231.

Oblong-ovate. Black, shining; above sparsely, beneath more densely clothed with whitish hairs; antennæ pale brownish-yellow, club dusky; scutellum and a small spot near humerus on each elytron densely white pubescent; tarsi piceous. Beak rather stout, slightly longer than head and thorax, opaque, striate, sparsely punctured. Head nearly smooth, front with a deep elongate fovea. Thorax two-thirds wider than long, sides broadly rounded; disc transversely impressed and constricted near apex, rather coarsely, not densely punctured. Elytra at base one-third wider than thorax, one-half longer than wide, sides nearly straight, separately rounded at apex; striæ fine on the disc, more deeply impressed on sides, their punctures small, oblong, remote; intervals wide, feebly convex, finely rugose. Length 2.5—3 mm.

Steuben and Posey counties, Ind., scarce; probably throughout the State; May 11—June 6. Rare near New York City in July. Ranges from Ottawa, Canada, Pennsylvania and Maryland to Florida and Texas. Found by Schwarz inhabiting the globular galls of a mite on the leaves of a night-shade, *Solanum elæagnifolium* Cav. in Texas, and by Hamilton on St. Johns wort, dogwood and hawthorn in Pennsylvania.

A. morulus Dietz (Smith's List of New Jersey Insects), is probably an error of identification, this species being known only from California.

432 (8649). ANTHONOMUS CORVULUS Lec., 1876, 201.

Oval, robust. Black, strongly shining, thinly clothed with rather long and easily removed pubescence; antennæ dark reddish-brown, paler at base; scutellum white pubescent. Beak as long as head and thorax, feebly curved, striate, coarsely punctate. Head minutely sparsely punctate, frontal fovea small. Thorax at base one-half wider than long, sides strongly rounded, narrowed at apex; disc coarsely and rather sparsely punctate. Elytra one-fourth wider at base than thorax, sides slightly widened to behind the middle; striæ wide, deeply impressed, coarsely punctate; intervals convex, finely, rather remotely punctate. Length 1.5—2.2 mm.

Steuben, Marshall and Posey counties, Ind., scarce; May 8—June 10. Swept from huckleberry. Rare near New York City in May. Somerset, Mass., June 4. Dunedin, Fla., Feb. 29; beaten from a species of dogwood. Ranges from Nova Scotia, Canada and New England to Wisconsin, south to Florida, Texas and Arizona. Occurs in Massachusetts on flowers of dogwood, *Prunus* and *Viburnum* in May and June; in Pennsylvania on the

squaw huckleberry, *Vaccinium stamineum* L., May to June. Resembles a small *Apion*. Easily known by its small size, shining black color, coarsely punctured thorax and sparse pubescence.

433 (10,991). ANTHONOMUS SUBGUTTATUS Dietz, 1891, 213.

Elongate-oval. Dark brown to piceous, shining; legs and base of antennæ usually paler; thorax with a narrow median stripe, wider at base, of condensed white pubescence; elytra with two oblique postmedian interrupted lines of condensed pubescence reaching from the sides to the second interval, where they unite, the space enclosed between these lines not denuded. Closely allied to *flavicornis* from which it differs as follows: Pubescence coarse, rather dense and white; beak more slender and shining, finely, less closely punctured, its median carina more distinct, extending to frontal fovea; second joint of funicle nearly one-half longer than third; thorax less rounded on the sides, which are almost straight behind, apex not constricted, punctures smaller and remote on the disc, crowded on the sides; tooth of claw very small, arising from side of claw near base. Length 2—2.7 mm.

Lake Ashley and Jacksonville, Florida. District of Columbia, West Virginia and New Jersey in July. Specimens in the Cambridge collection from Lake Ashley and Texas were labelled *subguttatus* by LeConte, who named (1876, 199) but did not describe it.

GROUP D.

Species not more than 3 mm. in length, having the first and second ventrals slightly longer than in Group C, nearly equal in length, the others gradually decreasing in size, beginning with the third instead of second segment as there (Fig. 79, *c*); elytra with a bare or denuded patch or band behind the middle, surrounded in fresh specimens by spots or lines of pubescence; first two tarsal joints equal or nearly so. All the known species, 12 in number, occur in our territory.

KEY TO SPECIES OF GROUP D.

a. Elytral intervals equal or nearly so.
  b. Front foveate.
    c. Color uniform reddish-brown.
      d. Larger, 2.3 mm., and more robust; second joint of funicle distinctly longer than third; thorax strongly rounded on sides.
        e. Frontal fovea small, punctiform; pubescence fine, inconspicuous.
          f. Elytra reddish; scutellar space and fascia darker, the latter interrupted on third interval. 434. SIGNATUS.
          ff. Elytra pitchy black, unicolorous; fascia not interrupted.
            g. Thorax scarcely one-fourth wider than long, the intervals of its punctures not alutaceous. 435. CONSIMILIS.
            gg. Thorax two-thirds wider than long, the intervals of its punctures alutaceous. 436. LIKENSIS.
        ee. Frontal fovea large, elongate; color uniform brown; pubescence coarse, white, conspicuous. 437. VESPERTINUS.

dd. Smaller, 1.8—2.2 mm., and less robust; second joint of funicle scarcely longer than third; thorax not strongly rounded on the sides.

h. Clothed above with pubescence only; pitchy black, elytra reddish-brown, suture darker. 438. MUSCULUS.

hh. Thinly clothed with broadly oval scales, intermixed with fine pubescence; yellowish-brown, each elytron with two black spots. 439. CONCINNUS.

cc. Color uniform reddish-brown or nearly so; frontal fovea very small.

i. Hind femora not toothed; elytra each with three small rounded white spots; length 1.8—2 mm. 440. SEXGUTTATUS.

ii. Hind femora slender, minutely toothed; elytra without white spots; length 2.2—2.4 mm. 441. UNIFORMIS.

bb. Front either sulcate or without fovea or sulcus.

j. Hind femora toothed; form oval; front sulcate.

k. Pitchy black; pygidium not freely exposed; thoracic punctures rather small; length 1.6—1.8 mm. 442. SULCIFRONS.

kk. Elytra dark red, base and suture darker; pygidium freely exposed; thoracic punctures coarse; length 2.7—3 mm. 443. MLÆPHONUS.

jj. Hind femora not toothed; form elongate-oval; front not foveate or sulcate; color black; length 1.8—2 mm. 444. SIMIOLUS.

aa. Elytral intervals alternately wider; black, pubescence very fine and scant above; length 2—2.5 mm. 445. INTERSTITIALIS.

434 (8638). ANTHONOMUS SIGNATUS Say, 1831, 25; ibid, I, 293.

Oval, robust. Piceous, thinly clothed with whitish pubescence, condensed on median line of thorax and scutellum; elytra dark red, the denuded fascia and scutellar space darker; antennæ dull yellow, club darker; legs piceous. Beak longer than head and thorax, slender, feebly curved, striate and punctate on the sides, carinate above. Thorax wider at base than long, sides feebly rounded, narrowed toward apex; disc densely and rather coarsely punctate. Elytra one-fourth wider at base than thorax, one-half longer than wide; striæ rather deep, their punctures large, close-set; intervals convex, finely punctulate. Length 2—3 mm. (Fig. 85.)

Fig. 85. The strawberry weevil. × 7. (After Chittenden.)

Common throughout Indiana; Apr. 21—June 17. Taken by sifting and on flowers of red-bud, *Cercis canadensis* L., in early spring; by beating and sweeping later. Occurs throughout New Jersey, more commonly in the southern counties; May—August. Common in Massachusetts on flowers of blackberry and *Vaccinium* in June, cutting off the pedicels of blackberry buds and boring into *Vaccinium* corolla. (*Frost.*) Ranges from Canada and New England to Wisconsin, south to Florida and Texas. Varies considerably in size and coloration from pale

reddish-brown to pitchy black, but the denuded fascia never reaches the suture. The variety *pallida* of Dietz is a mere color form.

A. *signatus* is known as the "strawberry weevil," the female depositing her eggs in the bud of strawberry, blackberry, raspberry or dewberry, then cutting or puncturing the stem below the bud, so that it falls off in a few days. Chittenden (1908) states that the flower then remains folded, the larvæ feeding on the pollen and other tissues within. The entire cycle of life from egg to adult is about 30 days. The adults also feed upon the pollen and petals of the berry plants, and hibernate. As far as known there is but one brood each season. Remedies: (a) Spraying just before blooming with crude carbolic acid, one part to 100 of water, or with Paris green or London purple, one pound to one hundred gallons of water; (b) Covering the strawberry buds with muslin or similar material; (c) Cultural remedies, including the cultivation of pistillate and profuse blooming varieties of strawberry, the use of trap crops, and clean culture.

435 (10.992). ANTHONOMUS CONSIMILIS Dietz, 1891, 216.

Form and size of *signatus*. Uniform pitchy brown or black, the denuded fascia always reaching to the first interval or suture; antennæ paler. Beak distinctly curved, less densely punctured and a little more slender; funicle less robust, its outer joints scarcely wider, the second more elongate and slender. Head opaque, rugulose. Thorax with the sides more strongly rounded, and more strongly narrowed in front. Length 2.5—2.8 mm.

Lawrence Co., Indiana, May 11. Taken by beating. Described from District of Columbia. Known also from Wisconsin and Illinois.

436 (——) ANTHONOMUS LIKENSIS sp. nov.

Broadly oval. Piceous-brown, shining, head, beak and femora darker; surface rather thickly clothed with fine prostrate whitish hairs condensed on scutellum, in the transverse lines enclosing the denuded area of elytra and on the sternal side pieces below; antennæ and tarsi pale reddish-brown, the club darker. Beak rather stout, cylindrical, scarcely as long as head and thorax, finely carinate, finely and densely reticulate-punctate. Head alutaceous, the frontal fovea very small. First joint of funicle slender, as long as the next three, second two-thirds longer than third, 3—7 subequal, gradually slightly wider. Thorax strongly transverse, two-thirds wider than long, sides strongly rounded, constricted near apex; disc with large rounded, rather densely placed punctures, their intervals distinctly alutaceous. Elytra one-third wider at base than thorax, sides almost straight to apical third, then broadly rounded to apex; striæ shallow, their punctures small, rounded, close-set; intervals feebly convex, very finely rugulose, minutely and sparsely punctate. Length 2—2.3 mm. (*W. S. B.*)

Frequent throughout southern Indiana; April 22—June 9. Taken by beating honey-locust and other foliage. Orange, New Jersey, June; Leng collection. Fredericksburg, Va., June 21, on honey locust; U. S. N. Museum collection. The form is broader than in *consimilis*, the thorax also shorter, broader and with very different sculpture. The denuded spot of elytra reaches the suture. In the three species, *signatus*, *consimilis* and *likensis*, the teeth of tarsal claws arise from between the bases of the claws, are approximate, parallel and nearly one-half the length of claw.

437 (10,993). ANTHONOMUS VESPERTINUS Dietz, 1891, 216.

Differs from *signatus* by its coarse pubescence, larger, elongate frontal fovea and nearly uniform brown color; elytral fascia wider, extending farther in front, and from the side to the second interval; side pieces of sterna densely clothed with white, scale-like hairs. Length 2.3—2.5 mm.

Vermillion County, Ind., rare; June 14—July 21. Known from Central Illinois, Georgia, Florida and Texas.

438 (8644). ANTHONOMUS MUSCULUS Say, 1831, 15; ibid, I, 277.

Elongate-oval. Dark reddish-brown or piceous, thinly clothed with white pubescence; elytra, except the suture, usually paler; scutellum white. Beak as long as head and thorax, feebly curved, opaque, finely carinate, minutely and rather densely punctate. Thorax one-half wider than long, gradually narrowed in front, sides broadly rounded, disc densely and rather coarsely punctate. Elytra one-third wider at base than thorax, sides parallel to middle, then gradually narrowed to apex; striæ deep, their punctures large and rather close-set; intervals convex, almost smooth. Length 1.8—2 mm.

Lake, Starke and Marshall counties, Ind., frequent locally; May 5—June 14. Swept from huckleberry and the flowers of the black choke-berry, *Aronia nigra* Willd. Occurs throughout New Jersey where it is not rare in July on huckleberry. Ranges from Ontario and New England to the Rocky Mountains, south to Florida. Varies in color, the elytra a brighter red in fresh specimens, but suture always darker; denuded spot usually darker and surrounded by a distinct line of pale hairs.

439 (10,994). ANTHONOMUS CONCINNUS Dietz, 1891, 217.

Oval. Reddish-brown, thinly clothed with small, white, broadly ovate scales, intermixed with fine pubescence; elytra each with a large blackish semicircular spot behind the middle and another at the junction of the fourth, fifth and sixth intervals, each spot surrounded by lines of condensed scales; a spot of pale scales at base of sixth interval, and thorax with a median and lateral lines of similar scales. Thorax more than one-half wider than long, strongly narrowed in front; disc very closely and rather

coarsely punctured. Elytra oval, one-fourth wider at base than thorax; striæ rather deep, their punctures large, close-set; intervals convex, each with a row of fine punctures, bearing recurved hairs. Length 1.8—2.2 mm.

Described from New Smyrna, Florida. Easily separated by the characters given in key.

440 (10.995). ANTHONOMUS SEXGUTTATUS Dietz, 1891, 219.

Oblong-oval. Pale reddish-brown, finely and sparsely clothed with whitish pubescence, which on each elytron is condensed in a small round spot on humerus and two on the fourth interval near front and hind margins of the denuded fascia; scutellum also densely pubescent. Beak about as long as head and thorax, rather stout, carinate, finely punctured. Second joint of funicle nearly as long as first, more than twice as long as third. Thorax wider than long, sides broadly rounded, disc with small, oval, rather sparse punctures, each bearing a prostrate white scale. Elytra suboval, very slightly wider at base than thorax, sides feebly rounded; strial punctures rather large, rounded, close-set; intervals feebly convex, minutely punctate. Femora strongly clavate, front and middle ones only toothed. Tooth of claw on side of base, rather long. Length 1.8—2 mm.

Known only from Florida. Dunedin, Jan. 25—March 29; Tampa, May 4—Sept. 9; swept from huckleberry. Resembles *rufipennis* but smaller, paler, with front not sulcate as stated by Dietz but punctiform, and hind femora unarmed.

441 (——). ANTHONOMUS UNIFORMIS sp. nov.

Elongate-oval, robust. Uniform pale reddish-brown, only the club and under surface slightly darker; above very thinly clothed with rather long, fine whitish hairs, condensed on the scutellum, in a narrow median line on thorax and in the usual postmedian transverse lines of the group on elytra. Beak rather stout, as long as head and thorax, female, slightly shorter, male, finely carinate, finely and rather thickly punctate. Head minutely alutaceous, very finely and sparsely punctate. Second joint of funicle three-fifths as long as first, one-half longer than third, 3 and 4 equal, 5—7 slightly longer, submoniliform. Thorax slightly wider than long, sides broadly rounded, disc rather strongly constricted behind the apex, deeply, coarsely and densely punctate. Elytra oval, convex, nearly one-third wider at base than thorax; striæ rather deep, their punctures small, round, close-set; intervals feebly convex, minutely and sparsely punctate. Abdomen finely and sparsely punctate, third ventral but slightly longer than fourth. Front femoral tooth very small. Tooth of tarsal claw arising from side of base, one-half the length of claw, the latter appearing cleft. Length 2.2—2.4 mm. (*W. S. B.*)

Lake Istokpoga and near Utopia on Lake Okeechobee, Fla.; Feb. 25.—March 4. Numerous specimens taken by beating. The subdenuded spot of elytra reaches the suture.

442 (8645). ANTHONOMUS SULCIFRONS Lec., 1876, 201.

Subovate. Dark piceous to black, shining; thinly pubescent above, more densely beneath. Second joint of funicle one-third longer than third.

Thorax wider than long, gradually narrowed from the base, feebly rounded on the sides, deeply and densely punctured. Striæ of elytra deep, coarsely punctured; intervals feebly convex, nearly smooth. Length 1.8—2.2 mm.

Frequent throughout Indiana; May 5—June 14; taken by sweeping. Ranges from Pennsylvania to Missouri, south to Florida. Resembles *corvulus* but longer, thorax more strongly rounded on the sides and less coarsely punctured, and the denuded fascia well defined. Resembles also *consimilis* but smaller with shorter and stouter beak. From *musculus*, of which Fall pronounces it a synonym, it is known by its darker elytra, less convex intervals, and shorter beak and tarsi.

443 (——) ANTHONOMUS MIÆPHONUS Pierce, 1912, 167.

Oval, robust. Black, above very sparsely clothed with fine yellowish pubescence, more dense on scutellum and in scattered spots on elytra; beneath more thickly clothed with fine scale-like hairs; elytra dark red, the base and suture, scape, funicle and tarsi darker; legs piceous. Beak rather slender, striate, coarsely punctate, carinate. First joint of funicle as long as the next two, second joint equal to third and fourth combined. Thorax slightly wider than long, base one-half wider than apex, sides broadly rounded; disc transversely impressed and constricted near apex, coarsely, closely and deeply punctate. Elytra very convex, one-third wider at base than thorax; strial punctures rather large, round and close-set; intervals feebly convex, each with an irregular row of minute, seta-bearing punctures. Length 2.7—3 mm.

Black Mts., North Carolina, June 28; Cambridge collection. Described from Round Knob, N. C. Beaten from bushes of the mountain laurel, *Rhododendron catawbiense* Michx.; June 22. The largest member of the group.

444 (——). ANTHONOMUS SIMIOLUS sp. nov.

Elongate-oval. Black, feebly shining, very sparsely clothed with fine, rather long prostrate white hairs, feebly condensed along the borders of the denuded area of elytra, strongly so on the scutellum and meso- and metasterna; scape, basal joints of funicle, tibiæ and tarsi rufo-piceous or paler. Beak slender, opaque, evenly cylindrical, as long as head and thorax, almost smooth and without carina. First joint of funicle stout, twice the length of second, the latter only one-fourth longer than third; 3—7 rounded, subequal in length, gradually slightly wider. Thorax conical, scarcely wider at middle than long, sides broadly rounded, narrowed and constricted near apex; disc deeply, densely and rather coarsely punctate, more finely near apex. Elytra one-half wider at base than thorax, striæ with rows of rather coarse, close-set punctures; intervals equal in width, feebly convex. Length 2—2.2 mm. (*W. S. B.*)

Tyngsboro, Mass.; Blanchard collection, one pair. Differs from the other black members of the group in its narrower form,

lack of frontal fovea, smooth beak and relative length of antennal joints. In form and general appearance strongly resembles an *Apion*.

445 (10,996). ANTHONOMUS INTERSTITIALIS Dietz, 1891, 219.

Elongate-subovate. Black, pubescence very fine and scant above, side pieces of thorax and sides of abdomen densely clothed with pale yellowish, scale-like hairs. Beak rather slender, punctured, the median carina distinct. Head subopaque, finely alutaceous. Thorax but little wider at base than long, sides strongly rounded and narrowed to tip; disc rather sparsely, sides more densely punctate, the punctures variable in size. Elytra oblong, at base one-third wider than thorax, sides nearly straight, slightly divergent behind; striæ feebly impressed, their punctures rather distant; intervals nearly flat, the second, fourth and sixth wider, the denuded fascia extending to the third. Hind femora not toothed. Length 2—2.5 mm.

Described from White Fish Point, Lake Superior, and District of Columbia.

GROUP E.

Species 2.5—3 mm. in length, having the third and fourth ventral segments equal in length or nearly so, and slightly shorter than in the two preceding groups; the fifth ventral of male longer than fourth. (Fig. 79, *d*.)

KEY TO EASTERN SPECIES OF GROUP E.

a. All the thighs armed with a single acute tooth.
b. Nearly uniform reddish-brown; front not foveate or sulcate. 446. UNICUS.
bb. Black or piceous, often feebly bronzed.
c. Front deeply foveate; color black. 447. NIGRINUS.
cc. Front sulcate; color piceous or blackish with feebly bronzed lustre; legs in part yellowish.
d. First joint of funicle long and slender; beak as long as head and thorax. 448. XANTHOCNEMUS.
dd. First joint of funicle short, strongly clavate; beak scarcely longer than thorax. 449. VARIPES.
aa. Hind thighs without a tooth; black, shining; elytra with denuded fascia and spots and lines of white scales. 450. SCUTELLATUS.

446 (——). ANTHONOMUS UNICUS sp. nov.

Oblong-oval, rather robust. Reddish-brown; antennal club and a large common faint blotch just behind scutellum fuscous; above very sparsely and evenly clothed with fine white, prostrate hairs; scutellum, sternal side pieces and sides of abdomen rather thickly clothed with shorter white pubescence. Beak rather stout, cylindrical, as long as head and thorax, female, one-fourth shorter, male, feebly carinate, finely and sparsely punctate. Antennæ inserted at apical fourth, male, third, female; first joint of

funicle stout, clavate, three-fourth longer than second which is very slender and twice as long as third, 3—7 subequal, gradually broader. Thorax one-third wider at middle than long, sides broadly rounded, feebly constricted near apex; disc coarsely, deeply and very densely punctate. Elytra one-third wider at base than middle of thorax, humeri prominent, rounded; striæ shallow, marked with rows of rather small, close-set punctures; intervals narrow, feebly convex. Length 2.5 mm. (*W. S. B.*)

Dunedin, Fla., scarce; March 12—Dec. 6. Beaten from red bay in a wet hammock. The color, slender second joint of funicle and non-foveate front easily distinguish this from other members of the group.

447 (8648). ANTHONOMUS NIGRINUS Boh., Schön., 1843, Pt. 2, 230.

Elongate-oval, robust. Black, thinly clothed with fine whitish pubescence; antennæ piceous. Beak rather stout, opaque, coarsely punctured, distinctly carinate, basal half striate each side. Thorax at base scarcely wider than long, sides broadly rounded, disc somewhat narrowed in front, very coarsely and densely punctate. Elytra oval, one-third wider at base than thorax, one-half longer than wide; striæ fine, their punctures rather coarse, somewhat distant; intervals flat, each with a few minute, scattered punctures. Length 3 mm.

Harrison, Crawford, Spencer and Posey counties, Ind., scarce; Apr. 21—June 20. Taken by sweeping. Staten Island, N. Y., and Da Costa, N. J.; July 16. Ranges from New York and Maryland to Louisiana. Chittenden (Ins. Life, VII, 350) states that it is known as the "potato bud weevil," breeding in the buds of the horse-nettle, *Solanum carolinense* L., and the potato, the adults severing the stems below the buds as does *A. signatus* those of the strawberry. The eggs are inserted in or between the anthers, on the pollen of which the larvæ feed. The horse-nettle is probably the true host plant. Resembles *flavicornis* but ventral segments different, thorax much more coarsely punctate and antennæ piceous.

Anthonomus albopilosus Dietz (1891, 222), black, more elongate than *nigrinus*, rather thickly clothed with long white pubescence, front tibiæ curved near base, first tarsal joint longer than second, femoral tooth large, length 2.8—3.3 mm., described from California, Texas and New Mexico, has been reported as occurring in Mississippi by Harned. We have not been able to see a specimen, hence it is omitted from the key.

448 (11,000) ANTHONOMUS XANTHOCNEMUS Dietz, 1891, 223.

Oval, robust. Dark piceous with a faint bronzed lustre, thinly clothed above with coarse whitish pubescence; more densely beneath with scale-like hairs; antennæ and tarsi, base of middle and hind femora and apical half of all tibiæ brownish-yellow; scutellum white, club dusky. Beak long and slender, flattened and slightly wider at apex, opaque, male, shin-

ing, female. Thorax at base one-third wider than long, sides nearly straight behind, strongly rounded in front, disc rather densely and coarsely punctured, more finely and sparsely near apex. Elytra broadly oval, striæ deeply impressed, their punctures rather large and close-set; intervals convex, rugulose and irregularly punctate. Length 2.5—3 mm.

Lake, Kosciusko and Posey counties, Ind., scarce; May 30—June 7. Known also from Canada, Michigan, Illinois and Wisconsin. Resembles *flavicornis* but distinguished by color of legs and short, subequal third and fourth ventral segments.

449 (——). ANTHONOMUS VARIPES Duval, 1857, 200.

Oval, robust. Black, shining, slightly bronzed, above sparsely, beneath more densely clothed with white pubescence; antennæ brownish, darker at middle; base of femora, upper part of tibiæ and tarsi also brownish, front femora entirely black; scutellum densely white pubescent. Beak enlarged at middle, curved, slightly striate at base; front with an elongate fovea. Thorax slightly conical, wider than long, sides broadly rounded, apex slightly emarginate, disc rather coarsely and closely punctate. Elytra short, oval, one-fourth wider at base than thorax, very strongly punctato-striate. Femora all armed with a small acute tooth. Length 2.2—2.5 mm.

Described from Cuba by Duval; redescribed by Linell (1897, 50) from Brownsville, Texas, as *A. brevirostris*. Occurs also at Biscayne Bay and Key West, Florida, where it is found on *Solanum torvum*. (*Schwarz.*)

450 (8637). ANTHONOMUS SCUTELLATUS Gyll., Schön., 1836, 342.

Oval. Black, shining; above thinly clothed with fine whitish hairs which are easily eroded; thorax with median line and another each side of denser white scales; elytra with a line behind scutellum, a humeral line or spot and two transverse oblique lines behind the middle, of similar scales; antennæ and tarsi reddish-brown; beneath densely clothed with white scales; scutellum white. Beak rather slender, subopaque, striate, punctate and with a fine median carina. Thorax at base one-fourth wider than long, sides feebly rounded, disc rather finely and densely punctate. Elytra oval, at base one-third wider than thorax; striæ wide, deep, their punctures large, close-set; intervals convex, finely punctate. Length 2.4—2.8 mm.

Lake Co., Ind., May 11. Many places near New York City; June—Oct. Batavia, N. Y., June 29. Ranges from Canada and New England to Michigan and Iowa, south to Missouri and Texas.

GROUP F.

Species ranging from 1.7 to 3 mm. in length, having the claws armed with a small, sharp basal tooth; abdominal segments subequal; pubescence evenly distributed both above and beneath.

KEY TO SPECIES OF GROUP F.

a. Dark brown or black.

b. Elytra not wider behind; pubescence yellow; mesosternum not carinate. 451. DISSIMILIS.

bb. Elytra wider behind; pubescence very sparse, whitish; mesosternum carinate. 452. ORCHESTOIDES.

aa. Brownish-yellow, elytra with a dark, oblique spot. 453. JUNIPERINUS.

451 (11,004). ANTHONOMUS DISSIMILIS Dietz, 1891, 226.

Elongate-oval. Brown, thinly clothed above with yellow pubescence; under side of thorax densely pubescent; head, beak and under surface nearly black; antennæ fuscous. Beak opaque, long, slender, curved, neither punctured nor striate. Frontal fovea small, elongate. Thorax much wider than long, sides nearly straight from base to middle, rather strongly narrowed in front; disc rather finely, not densely punctate. Elytra oblong-oval, one-fourth wider at base than thorax, sides feebly and gradually rounded to apex; striæ fine, with small, close-set punctures; intervals slightly convex, finely rugose. Length 3 mm.

Described from Virginia. Resembles *angularis* in form, color and pubescence, but differs by the 7-jointed funicle, absence of elytral fascia and very slender tooth of claw.

452 (11,005). ANTHONOMUS ORCHESTOIDES Dietz, 1891, 226.

Elongate-ovate. Black, somewhat shining, very thinly clothed with fine whitish pubescence, hardly more dense beneath; antennæ reddish brown. Beak rather stout, remotely punctured, slightly widened and somewhat shining near tip. First joint of funicle very robust, second longer than third, 3—7 rounded. Thorax wider than long, but slightly narrower at apex than base, widest at middle; disc closely and rather coarsely punctured. Elytra a little wider at base than thorax, widened to and more convex behind the middle; striæ fine, their punctures rather small, not close-set; intervals feebly convex, finely wrinkled. Femora all armed with a sharp, distinct tooth. Length 1.7—2 mm.

Known from Maryland, District of Columbia and Missouri.

453 (8640). ANTHONOMUS JUNIPERINUS Sanborn, Proc. Bost. Soc. Nat. Hist., XII, 1868, 81.

Subovate. Pale brownish-yellow, rather densely clothed with pale yellowish pubescence; elytra each with a dark, oblique denuded spot behind the middle, extending from the fifth to the second interval. Beak darker, shining, long and slender, finely punctate. First joint of funicle as long as the next three united, second longer than third. Thorax wider than long, not strongly narrowed in front, sides feebly rounded; disc finely, not closely punctate. Elytra scarcely wider at base than thorax, slightly widened to behind the middle; striæ fine, feebly impressed, their punctures small, not close-set; intervals wide, nearly flat, rugulose. Femora all with a rather large, triangular tooth. Length 2.2—2.8 mm.

Anglesea and Bayside, N. J., Sept. 22; on juniper. Ranges from Massachusetts to West Virginia, south to Florida. Lives in *Podysoma,* a parasitic fungus on juniper.

GROUP G.

Our species of this group range from 2.7 to 3.5 mm. in size and have the upper and lower surfaces more or less clothed with scales, which vary in shape from almost round to very elongate and hair-like. Five of the 11 species tabulated by Dietz are recorded from our territory. All have the femora armed with a single tooth beneath.

KEY TO EASTERN SPECIES OF GROUP G.

a. Front thoracic opening very oblique; prosternum short in front of the coxæ.
b. Elytra without a transverse, partly denuded fascia; second joint of funicle scarcely longer than third.
c. Legs reddish or reddish-brown; front and middle tibiæ not or feebly bisinuate beneath. 454. TECTUS.
cc. Legs dark piceous; front and middle tibiæ strongly bisinuate and subangulate beneath. 455. SQUAMULATUS.
bb. Elytra with a dark, transverse, partly denuded fascia; dark reddish-brown, the legs paler. 456. MOLOCHINUS.
aa. Front thoracic opening less oblique; prosternum more elongate in front of the coxæ.
d. Thorax strongly constricted near apex; second joint of funicle scarcely longer than third. 457. RUFIPES.
dd. Thorax not constricted at apex; second joint of funicle as long as the next two. 458. DISJUNCTUS.

454 (8653). ANTHONOMUS TECTUS Lec., 1876, 203.

Oval. Piceous, densely clothed with white and yellowish-gray scales, condensed on the suture and on basal halves of fourth to seventh intervals of elytra; basal half of antennæ reddish-brown, club dusky. Beak pubescent at base, coarsely punctured, striate. Frontal fovea elongate. Thorax at base slightly wider than long, narrowed from base to apex, sides feebly rounded, disc densely and finely punctured. Elytra ovate, suddenly one-third wider at base than thorax, strial punctures coarse, almost wholly concealed by the scales; intervals almost flat. Length 3—3.2 mm.

Lake County, Ind., rare; May 27. Edgebrook, Ill., June 14. Described from Massachusetts and Georgia. Ranges from New England to Kansas. Taken in numbers from wild asters, *Ionactis linariifolius* L., at Tyngsboro, Mass., by Blanchard in September. (*Fall.*)

455 (11,006). ANTHONOMUS SQUAMULATUS Dietz, 1891, 230.

Subovate. Black, somewhat shining; sparsely clothed above with small white, broadly oval scales, intermixed with fine, suberect hairs; scutellum, suture and basal portions, in part, of fourth and sixth intervals densely covered with white scales. Thorax one-half wider than long, strongly narrowed in front, disc densely and rather coarsely punctured. Elytra broadly oval, one-fourth wider at base than thorax; strial punctures rather coarse, not close; intervals convex, finely rugose. Length 2.7 mm.

Lake Co., Ind., May 30. Described from Wisconsin and Missouri. Smaller than *tectus* with shorter, more robust beak and bisinuate tibiæ.

456 (11,007). ANTHONOMUS MOLOCHINUS Dietz, 1891, 231.

Elongate-oval. Dark reddish-brown, clothed with small, pale scales intermixed with very fine brown pubescence; the scales forming indistinct pale median and lateral lines on thorax, covering the scutellum and part of suture and forming a short basal stripe on sixth interval and a short one near middle of fourth interval of elytra. Beak piceous, long and slender, punctured, carinate above. First and second joints of funicle elongate, slender. Thorax at base nearly twice as wide as long, strongly narrowed in front, disc densely, finely and shallowly punctate. Elytra oval, nearly one-third wider at base than thorax; striæ fine, their punctures large, rounded, rather distant; intervals nearly flat, punctured. Length 3 mm.

Franconia, New Hampshire, Sept. 2; Blanchard collection; taken from wild asters by Mrs. Slosson. Ottawa, Canada, June 14. Described from Montana.

457 (8659). ANTHONOMUS RUFIPES Lec., 1876, 204.

Oval, robust. Black or piceous, above thinly clothed with grayish scales intermixed with fine hairs, beneath more densely clothed with larger scales; antennæ and legs reddish-brown, club dusky; scutellum white. Beak rather short and stout, feebly curved, punctured, sparsely pubescent, distinctly carinate and striate. Frontal fovea small, elongate. Thorax at base one-half wider than long, sides strongly rounded; disc finely, densely and deeply punctured. Elytra oval, scarcely wider at base than thorax; striæ with coarse, round, rather close-set punctures; intervals feebly convex, finely wrinkled. Length 3—3.2 mm.

Batavia, N. Y.; July 25—Aug. 6. McGregor, Iowa, July 15. Recorded from Delaware, New York, Illinois and Iowa.

458 (8658). ANTHONOMUS DISJUNCTUS Lec., 1876, 204.

Oblong-oval. Dark brown to piceous, not densely clothed above with pale or brownish scales, beneath more densely with paler scales; scape, basal joints of funicle and legs reddish-brown; thorax with three dorsal lines of white scales; scutellum, basal half of sixth and middle third of fourth intervals of elytra also with white scales. Beak longer and more slender than in *rufipes*, shining, finely punctured and striate. Thorax slightly wider than long, gradually narrowed from base to apex, sides feebly rounded, disc coarsely and deeply punctured. Elytra oval, not wider at base than thorax; strial punctures coarse, intervals feebly convex. Length 3.2—3.5 mm.

Various points in New Jersey and at Charlotte and Montauk, N. Y.; July 16—Sept. 23. Ranges from New York to Illinois,

Georgia and Texas. Pierce (1907, 217) records it as breeding in the heads of *Heterotheca subaxillaris* Lam. in Texas, the larvæ feeding on the achenes.

SUBGENUS VI. (*Sexarthrus.*)

We have combined under this subgeneric name all eastern species of the genus *Anthonomus* having the funicle only 6-jointed. It embraces, therefore, the *subfasciatus* and *ungularis* groups of the subgenus Anthonomus of Dietz, and also the eastern forms of his subgenus *Cnemocyllus*. They may be separated into three groups as follows:

KEY TO GROUPS OF SUBGENUS SEXARTHRUS.

a. Form oval or oblong-oval; hind tibiæ alike in both sexes.
b. Claws armed with a large distinct tooth. GROUP A.
bb. Claws armed with a short basal tooth. GROUP B.
aa. Form elongate, subparallel; hind tibiæ of male curved. (Fig. 79, *g.*) GROUP C.

GROUP A.

Species not over 2 mm. in length, having the funicle 6-jointed and the claws armed with a long tooth. According to Fall (1913, 54) *latiusculus* Dietz is a synonym of *subfasciatus* Lec., and *molleculus* Casey the same as *robustulus* Lec. This leaves only the two LeConte species and a third as yet undescribed, as members of the group.

KEY TO SPECIES OF GROUP A.

a. Brown, pubescent; elytra with a partly denuded fascia. 459. SUBFASCIATUS.
aa. Black, in part scaly; elytra without fascia.
b. Legs piceous; elytra without scutellar white spot. 460. ROBUSTULUS.
bb. Legs pale reddish-brown; elytra with scutellar spot of white scales. ——. ROBINSONI.

459 (8662). ANTHONOMUS SUBFASCIATUS Lec., 1876, 205.

Subovate, robust. Dark reddish-brown, head, thorax and suture often darker; above thinly clothed with yellowish pubescence, which is condensed on the scutellum and along the median line of thorax and forms a line around the denuded fascia of elytra, the latter extending from the sides to the suture. Beak as long as head and thorax, feebly curved, indistinctly punctate, striate and carinate. Second joint of funicle slightly longer than third, 4—6 short, rounded. Thorax one-fourth wider than long, widest at middle, sides regularly rounded, disc densely and rather coarsely punctate. Elytra ovate, one-third wider at base than thorax; striæ deeply impressed, coarsely and closely punctate; intervals rather wide, feebly convex, almost smooth. Femora with a small acute tooth. Length 1.5—2 mm.

Five-Mile Beach, N. J., on holly in April. Fall River, Mass., May 31. Dunedin, Fla., common; Feb. 14—April 4; taken by beating in hammock. Ranges from Canada and New England to Florida and Texas. Resembles *musculus* but smaller, broader and more robust, and readily separated by the 6-jointed funicle.

460(8664). ANTHONOMUS ROBUSTULUS Lec., 1876, 205.

Broadly oval. Black, sparsely covered with small, dirty white wedge-shaped scales, which are slightly larger and more condensed on under side of thorax; antennæ and tarsi brownish-yellow, club dusky; legs piceous. Beak slightly longer than head and thorax, slender, punctured and feebly striate. Second and third joints of funicle equal. Thorax one-half wider than long, strongly narrowed at apex, sides broadly rounded; disc densely, deeply and rather coarsely punctured. Elytra at base nearly one-third wider than thorax, but slightly longer than wide; striæ distinct, their punctures elongate, close-set, coarser at base; intervals flat. Front thighs minutely toothed. Length 1.5—1.8 mm.

Edgebrook, Ill., August 27. Hopatcong and Jamesburg, N. J.; July. Portage and Sandy Hill, N. Y.; May 24—July. Ranges from New England to Wisconsin and Montana, south to Virginia. Occurs on goldenrod (*Solidago*). Fall has pointed out that the front thighs in the type of *robustulus* are minutely toothed, though stated otherwise by LeConte. As this was the principal character on which Casey based his *molesculus*, the two species are inseparable. Known by its 6-jointed funicle, short, broad form and grizzly-gray scales.

The following species was received too late to give it its proper serial number.

(——). ANTHONOMUS ROBINSONI sp. nov.

Oval, robust. Black, feebly shining; legs pale reddish-brown, antennæ piceous; above finely pubescent, thorax with sides and a median spot at base thinly clothed with large, whitish scales; elytra with an elongate scutellar spot of similar scales; entire under surface thickly clothed with large, oval, white scales. Beak as long as thorax, slender, evenly cylindrical, densely marked with elongate punctures. Head densely and coarsely punctate. Antennæ inserted at middle of beak, first joint of funicle stout, clavate, second two-thirds as long, slender, 3—6 short, rounded, subequal. Thorax one-fourth wider than long, sides feebly rounded, disc very slightly constricted near apex, deeply, coarsely and very densely punctate. Elytra broadly oval, one-third wider at base than thorax, sides feebly curved from base to the broadly rounded apex; striæ coarse, deep, rather indistinctly punctate; intervals convex, not wider than striæ, each with two rows of very fine rugose punctures, each puncture bearing a minute yellowish prostrate hair. Last ventral broadly emarginate. Tooth of tarsal claw long, slender. Length 1.8 mm. (*W. S. B.*)

West Point, N. Y., April 27. (*Robinson.*) Batavia, N. Y., June 3. (*Knight.*) Named in honor of Col. Wirt Robinson, of West Point, N. Y. The deeper striæ, pale legs and white scutellar spot easily distinguish this from *robustulus*. The elytra of the Batavia specimen show dull red through the vestiture. In general appearance closely resembles a *Centorhynchus*.

GROUP B.

Species not over 2.8 mm. in length and oblong-oval in form, the elytra (except in *cylindricollis*) with a faint transverse denuded fascia, the claws with a short, inconspicuous tooth.

KEY TO SPECIES OF GROUP B.

a. Front femora toothed; surface pubescent; beak long and slender.
b. Dark chestnut brown, pubescence yellowish; femora feebly clavate; larger, 2.3—2.8 mm. 461. UNGULARIS.
bb. Reddish-brown to piceous, pubescence white.
c. Eyes with a line of white pubescence along their inner margins; femora strongly clavate, all toothed; length 2—2.2 mm. 462. FLORALIS.
cc. Eyes not bordered with line of white hairs; femora feebly clavate, the front ones only toothed; length 1.7 mm. 463. DEBILIS.
aa. Front femora not toothed; beak short and stout.
d. Form broadly oval; color reddish-brown, surface scaly; length 1.8—2.2 mm. 464. NUBILUS.
dd. Form oblong-oval; color uniform piceous, surface pubescent; length 1.6 mm. 465. CYLINDRICOLLIS.

461 (8666). ANTHONOMUS UNGULARIS Lec., 1876, 206.

Oblong-oval. Dark brown, thinly clothed with coarse yellowish pubescence, more dense on thoracic side pieces and in line surrounding a faint transverse denuded fascia on elytra; head, beak and thorax darker, sometimes even piceous; antennæ and legs paler. Beak rather stout, alutaceous, feebly curved, as long as thorax and with a basal stria each side, male; one-fourth longer, more shining, without stria, female. Frontal fovea small, distinct. Second joint of funicle nearly twice as long as third; 3—6 rounded, subequal. Thorax wider than long, sides broadly rounded; disc narrowed in front of middle, closely, deeply and rather coarsely punctured. Elytra oblong, one-fourth wider at base than thorax; sides straight for two-thirds their length, then gradually rounded to apex; striæ fine, their punctures elongate, not close-set; intervals nearly flat, smooth. Tooth of femora very small. Length 2.3—2.8 mm.

Lakehurst, N. J., July 12. White Sulphur Springs, W. Va., July 5. Ranges from New York to Michigan, south to Florida. Occurs on the wild senna, *Cassia marylandica* L.

462 (11,011). ANTHONOMUS FLORALIS Dietz, 1891, 238.

Smaller and narrower than *ungularis*. Reddish-brown to piceous, clothed with coarse white pubescence, condensed in a median line and on sides of thorax, and forming a line along the inner margin of the eyes. Beak slender, finely and sparsely punctate, striate. Thorax less narrowed in front, sides more strongly rounded; disc coarsely, not densely punctured. Elytra one-third wider at base than thorax; striæ wider, more deeply impressed, punctures larger, rounded; intervals feebly convex, rugose. Length 2—2.2 mm.

Described from Florida and North Carolina.

463 (——). ANTHONOMUS DEBILIS sp. nov.

Oblong-oval. Uniform reddish-brown, very thinly clothed with fine white hairs, condensed only on scutellum, sternal side pieces and in two oblique faint lines bordering the subdenuded fascia of elytra; scape and funicle of antennæ paler. Beak very slender, as long as head and thorax, finely striate, minutely and sparsely punctate. First joint of funicle stout, two and a half times the length of second, the latter but slightly longer than third, 3—6 gradually wider. Thorax as long as wide, sides almost parallel; disc feebly narrowed at apex, coarsely, deeply and rather densely punctate. Elytra one-third wider at base than thorax, sides straight to apical third; striæ deep, their punctures round, coarse, close-set; intervals convex, smooth. Under surface very finely and sparsely punctate. Tooth of front femora very small; middle and hind ones unarmed; tooth of claw very small. Length 1.7 mm. (*W. S. B.*)

Cedar Keys, Florida, June 6. One specimen, No. 53 without name, in the LeConte collection.

464 (8665). ANTHONOMUS NUBILUS Lec., 1876, 205.

Rather broadly oval. Pale to dark reddish-brown, above thinly clothed with small, yellowish-white scales intermixed with a fine, suberect pubescence; scutellum and a spot behind, an oblique band just behind the middle and the declivity of the elytra more densely scaly, suture darker; sternal side pieces densely scaly. Beak shorter than head and thorax, stout, finely and densely punctate, more shining near tip. Second joint of funicle scarcely longer than third. Thorax slightly wider than long, widest at middle, sides strongly rounded, disc densely and coarsely punctate. Elytra oval, one-third wider at base than thorax, striæ wide, rather deep, their punctures coarse; intervals convex, finely rugose. Length 1.6—2 mm.

Orange Co., Ind., May 28. Orange Mts. and Anglesea, N. J. Wellesley, Mass., July 12. Ranges from New England and Pennsylvania to Florida and Texas. Bred from St. Andrew's Cross, *Ascyrum hypericoides* L., at Plummer's Island, Maryland. (*Schwarz.*)

465 (——). ANTHONOMUS CYLINDRICOLLIS sp. nov.

Oblong-oval. Uniform dark piceous-brown, shining, very thinly clothed with short, almost imperceptible pubescence; scape and funicle of antennæ

paler, legs dark reddish-brown. Beak stout, scarcely longer than thorax, both it and head finely alutaceous, minutely and very sparsely punctate; front with a fine impressed line. Antennæ inserted in front of middle, scape short, stout, first joint of funicle scarcely longer than broad, second and third as wide as long, half the size of first, fourth very short, five and six larger. Thorax subcylindrical, as wide as long, sides almost straight, very feebly converging toward apex, disc coarsely, deeply, not densely punctate, the intervals between the punctures alutaceous.. Elytra one-third wider at base than thorax, sides parallel to apical third, then broadly rounded to apex; striæ shallow, their punctures coarse, feebly impressed, intervals smooth, slightly convex. Under surface finely and very sparsely punctate. Third ventral slightly shorter than fourth, the two united one-third longer than second. All the femora unarmed; tarsal claw very small. Length 1.6 mm. (*W. S. B.*)

Gray Beard Mountain, North Carolina, May 26. One specimen in Cambridge collection. The 6-jointed funicle and small tooth of claw place it in this group, with the other members of which it has little affinity. The antennal grooves are directed toward the lower border of the eye, but the unarmed femora, color and almost glabrous surface preclude its being a *Pseudanthonomus*.

GROUP C.

Elongate, subparallel species not more than 3 mm. in length, having the surface thinly clothed with scales, forming lines on the fourth and sixth intervals of elytra; last ventral of female foveate; hind tibiæ dissimilar in the sexes, those of male more or less curved. They belong to the subgenus *Cnemocyllus* of Dietz. Only two of his 12 species occur in our territory. Both have the funicle 6-jointed, the front femora feebly toothed and the fifth ventral of male elongate.

KEY TO EASTERN SPECIES OF GROUP C.

a. Second and third joints of funicle subequal in length, united equal to first; thorax scarcely wider than long. 466. ELONGATUS.

aa. Second joint of funicle distinctly longer than third, almost as long as first; thorax one-third wider than long. 467. DECIPIENS.

466 (8660). ANTHONOMUS ELONGATUS Lec., 1876, 204.

Strongly elongate, nearly parallel. Dark brown, clothed with large rounded, pale brown and whitish scales, the latter forming a narrow median and broader lateral lines on thorax and condensed each side of scutellum, along the base of elytra and on the sixth interval from base to near the middle; denuded fascia surrounded by a broad stripe of white scales, including a short white line on fourth interval; antennæ brownish-yellow, club dusky; legs reddish-brown. Beak as long as head and thorax, male, one-fourth longer, female, slender, cylindrical, curved, densely punctured, finely carinate. Thorax with sides feebly rounded, disc coarsely and

densely punctured. Elytra elongate-oval, but slightly wider at base than thorax, sides parallel to beyond middle, thence converging and broadly rounded to tips; striæ wide, deep, their punctures elongate; intervals feebly convex, finely rugose. Length 2.3—3 mm. (Fig. 81, *d.*)

Lake, Lawrence, Orange and Spencer counties, Ind., scarce; May 12—June 11. Taken by sweeping. Canastota, N. Y., March 12. Snake Hill, Arlington, Newark and Anglesea, N. J.; May—June. Ranges from Quebec and New England to Nevada, south to Florida. Breeds in a twig-gall on *Bigelovia* in Colorado. (*Schwarz.*) Common on flowers of *Prunus*, May 25. (*Frost.*)

467 (8668). ANTHONOMUS DECIPIENS Lec., 1876, 206.

Elongate-oblong. Dark brown or piceous, rather densely clothed above and beneath with large, oval, grayish-white scales, becoming hair-like on the abdomen, and often condensed along the median third of fourth and basal third of sixth intervals; antennæ and legs reddish-brown; sides of elytra usually with a dark, ill-defined cloud behind the middle. Beak longer than head and thorax, curved, shining, coarsely punctured near base. Thorax with sides feebly rounded, strongly narrowed near apex, densely and rather finely punctured. Elytra at base slightly wider than thorax, sides almost parallel, obliquely narrowed and rounded to tip; striæ wide, deep, coarsely and closely punctured; intervals slightly convex, finely rugose. Front femora feebly toothed. Length 2—2.2 mm.

Recorded from Michigan, Kansas, Texas, Oregon and Washington. Beaten abundantly from *Crataegus* by Dr. Hamilton. Pierce states (1907, 272) that it occurs on cotton and *Callirrhœ involucrata* T. & G. in Texas.

XII. NEOMASTIX Dietz, 1891. (Gr., "new" + "whip.")

Antennæ slender; funicle 5-jointed, first joint long and robust, 2—5 nearly equal, club broadly oval, closely jointed, the basal joint shining (Fig. 78, *c*); first and second ventrals rather long; 3—5 short, equal; legs not very slender, femora not toothed; front and middle tibiæ with claws, hind ones feebly spined; tarsal claws with a sharp, rather long tooth. Males with fifth ventral broadly emarginate and pygidium freely exposed. Two species were described by Dietz, but Fall (1913, 59) who has studied the types, states that they are identical.

468 (11,028). NEOMASTIX SOLIDAGINIS Dietz, 1891, 255.

Oval, rather robust. Reddish-brown to piceous, rather thickly clothed with yellowish, subprostrate pubescence. Beak slightly longer than head and thorax, rather stout, punctured, striate, pubescent. Head sparsely punctured, front feebly impressed. Thorax two-thirds wider than long, narrowed in front, feebly and broadly constricted at apex; sides feebly rounded from base to middle; disc densely and rather coarsely punctured,

sometimes with a faint median elevated line. Elytra oval, one-third wider at base than thorax; striæ deep, their punctures coarse, close-set; intervals convex, finely and sparsely punctulate. Length 1.5 mm.

Recorded from Atco, Clementon and Buena Vista, N. J. Frequent at Dunedin, Sanford and Ormond, Fla., on the flowers of the Ericad, *Andromeda nitida* Bart.; Jan. 19—April 15. Ranges from New England and Pennsylvania south to Florida. Occurs late in the fall on deflorescent flower-heads of goldenrod, (*Solidago*). (*Dietz.*)

XIII. Pseudanthonomus Dietz, 1891. (Gr., "false"+Anthonomus.)

The species of this genus are all of a reddish-yellow or reddish-brown color, pubescent both above and below, and without scales. They differ from *Anthonomus* by having the antennal grooves directed beneath or against the lower border of the eyes (Fig. 78, *j*) and have the beak rather stout, curved; antennæ inserted three-fifths, male, or one-half, female, from its tip; antennal club loosely jointed, pubescent; thorax wider than long, bisinuate at base, narrowed in front and constricted at apex; elytra usually transversely impressed behind the base, their striæ and punctures coarse and deep; scutellum densely pubescent; ventral segments nearly equal; pygidium exposed; femora feebly clavate, usually toothed; tibiæ slender, the front and middle ones with a hook, the hind ones with a short spine at apex; tarsal claws with a long and slender tooth. Eleven of the 14 known species occur in our territory.

KEY TO EASTERN SPECIES OF PSEUDANTHONOMUS.

a. Funicle 6-jointed.
b. Femora, at least the front ones, toothed.
c. Second joint of funicle longer than third.
d. Larger, 2.2—3 mm.; thorax without a row of large punctures across the post-apical constriction; fourth joint of funicle smaller than third.
e. Antennal grooves scarcely oblique, directed against the lower extremity of the eyes; elytra wider at base than thorax.
f. Pubescence condensed on median line of thorax.
g. Pubescence long, yellow and condensed in patches or bands on elytra. 469. CRATÆGI.
gg. Pubescence short, white, equally distributed on elytra. 470. VALIDUS.
ff. Pubescence not condensed on median line of thorax, long, coarse, yellow, evenly distributed on elytra. 471. HAMAMELIDIS.

ee. Antennal grooves very oblique, directed beneath at a distance from the eyes (Fig. 78, *j*); elytra scarcely wider at base than thorax. 472. INCIPIENS.

dd. Smaller, not over 2 mm.; thorax with a transverse row of large punctures across the constriction; fourth joint of funicle as large as third. 473. PUNCTICOLLIS.

cc. Second and third joints of funicle nearly equal.

h. Robust species, elytra suddenly wider at base; fourth joint of funicle small; alternate intervals narrow. 474. SERIESETOSUS.

hh. Elongate, slender species.

i. Fourth joint of funicle shorter than the others.

j. Larger, 2.5 mm.; elytra scarcely wider at base than thorax, the latter not strongly rounded at sides. 475. LONGULUS.

jj. Smaller, 2 mm.; elytra wider at base than thorax, the latter strongly rounded at sides. 476. RUFULUS.

ii. Joints 4—6 of funicle equal; thoracic punctures small; eyes feebly convex; length 2.2 mm. 477. PARVULUS.

bb. All the femora unarmed; second joint of funicle scarcely longer than third; form robust; antennal grooves directed beneath the eyes. 478. INERMIS.

aa. Funicle 5-jointed, its second joint longer than third, fourth and fifth nearly equal. (Fig. 78, *l*.) 479. RELICTUS.

469 (8661). PSEUDANTHONOMUS CRATÆGI Walsh, 1867, 266.

Elongate-oval. Pale reddish-brown with a rather dull lustre; thinly clothed with long yellowish pubescence, condensed along the entire median line of thorax, and in small spots, patches or subtransverse lines on the elytra. Beak punctured, feebly striate. Frontal fovea elongate. Thorax one-fourth wider than long, sides broadly rounded; disc feebly constricted near apex, densely and rather coarsely punctured. Elytra one-fourth wider at base than thorax; striæ wide, their punctures coarse; intervals convex. Length 2.5—2.8 mm. (Fig. 86.)

Fig. 86. × 12.
(After Slingerland.)

Lake, Starke, Putnam and Fountain counties, Ind., frequent; April 17—July 5. Beaten from *Cratægus*. Not rare near New York City, May to September, beaten from wild cherry. Ranges from Nova Scotia, Canada and New York to Wisconsin, south to Florida and Texas. Parasitic in galls on *Cratægus crus-galli* L. (*Waish.*) On flowers of *Prunus*, May 3. (*Frost.*) Bred from seed pods of *Kalmia latifolia* L. (*Dury.*)

470 (11,018). PSEUDANTHONOMUS VALIDUS Dietz, 1891, 250.

Oblong-oval. Pale reddish-brown, a little more robust and shining than *cratægi;* thinly clothed with fine, pale yellowish or whitish pubescence, condensed along median line of thorax from base to about the middle, and arranged on elytra in three irregular rows on each interval. Beak distinctly shorter and stouter than in *cratægi*, punctured and substriate.

Thorax one-half wider than long, strongly narrowed in front, broadly constricted near apex, densely and deeply punctured. Elytra oval, at base nearly one-third wider than thorax; strial punctures rather large, transverse; intervals convex, rugose, the alternate ones wider towards base. Length 2.2—2.7 mm.

Steuben, Starke and Putnam counties, Ind., scarce; May 6—Oct 17. Described from Canada, Nebraska, Colorado and New Mexico. Recorded from Ohio.

471 (——). PSEUDANTHONOMUS HAMAMELIDIS Pierce, 1908, 180.

Oblong-oval. Pale reddish-brown, rather thickly clothed with long yellowish, very evenly distributed pubescence. Beak as in *validus*. Second joint of funicle twice the length of third. Thorax not much wider than long, sides rounded to and but slightly constricted before apex; disc coarsely, densely and deeply punctured. Elytra one-third wider at base than thorax; striæ deeply impressed, their punctures large and distinct; intervals convex, shining, equal in width at base. Length 2 mm.

Lake George, N. Y., August 30. Afton, Virginia. Bred in August from the fruit of witch-hazel, *Hamamelis virginiana* L. Resembles the two preceding but rather paler, thorax less constricted near apex, its pubescence longer and more evenly distributed.

472 (11,019). PSEUDANTHONOMUS INCIPIENS Dietz, 1891, 250.

Elongate, subovate. Dark reddish-brown, antennæ and legs paler; thinly clothed with yellowish-gray pubescence, which is nearly evenly distributed on thorax and elytra. Beak stout, shorter than head and thorax, slightly widened from base to apex, coarsely punctured, pubescent on basal half. Thorax a little wider than long, widest at middle, sides rounded, disc densely and deeply punctured. Elytra oblong, one-fourth wider at base than thorax, sides almost straight, nearly parallel; striæ wide, deep, their punctures large, close-set; intervals convex, finely punctulate and rugose. Length 2.5—2.8 mm.

Common throughout the northern half of Indiana; Lawrence county only in the south; May 18—August 15. Beaten from dead limbs of tamarack, *Larix laricina* DuRoi, and from flowers of the tall blue-berry, *Vaccinium corymbosum* L. Passiac, N. J., and Staten Island, N. Y. Beaten in multitudes from laurel, *Kalmia angustifolia* L., just out of bloom. (*Hamilton.*) Ranges from New York and Canada to Michigan, south to District of Columbia. Resembles *crataegi* but darker, with pubescence shorter, more evenly distributed and scarcely yellow.

473 (——). PSEUDANTHONOMUS PUNCTICOLLIS sp. nov.

Elongate-oval. Pale reddish-brown, thinly clothed with very fine white pubescence, not condensed on any portion of the body. Beak slender, as

long as head and thorax, finely and sparsely punctate. Antennæ inserted at apical third, the grooves directed against the lower margin of eye; second joint of funicle twice as long as third, 3—5 subequal, rounded, the fourth not smaller, sixth slightly larger. Thorax as long as wide at basal third, sides broadly rounded from base to beyond middle, strongly constricted near apex; disc convex, rather coarsely and densely punctured behind the constriction, a row of larger rounded punctures in the groove, in front of these the disc alutaceous, more finely and sparsely punctate. Elytra oblong-oval, one-third wider at base than thorax; striæ deep, their punctures large, close-set; intervals convex, minutely and remotely punctate. Abdomen shining, almost smooth. Length 2 mm. (*W. S. B.*)

Fountain Co., Ind., rare; May 28. A slender species, easily known by the peculiar sculpture of thorax and joints 3—5 of funicle subequal.

474 (11,020). PSEUDANTHONOMUS SERIESETOSUS Dietz, 1891, 251.

"Oval. Of the same color and pubescence as *validus;* differs in having the beak of male stouter and shorter, densely punctured and finely striate; the second and third joints of funicle equal. Frontal sulcus long, deep and linear. Thorax one-third wider than long, the median pubescent line narrow, entire or nearly so. Elytra gradually narrowed from base to apex, the fourth, sixth and eighth intervals narrower than the others. Length 2.3 mm." (*Dietz.*)

Known from Detroit, Mich., District of Columbia and Nebraska.

475 (11,023). PSEUDANTHONOMUS LONGULUS Dietz, 1891, 252.

Elongate. Dull reddish-brown, sparsely clothed with yellowish pubescence, somewhat condensed on sides and along the median line of thorax, and in irregular spots on the elytra. Beak stout, scarcely wider at apex, densely punctured, basal half carinate above, striate each side. Frontal fovea small, round. Thorax broadly rounded on the sides, apex distinctly constricted, disc densely and rather coarsely punctured. Elytra elongate; strial punctures rather large, close-set; intervals convex, each with two rows of minute punctures. Length 2.5 mm.

Jamesburg, N. J., July 4. District of Columbia and North Carolina.

476 (11,024). PSEUDANTHONOMUS RUFULUS Dietz, 1891, 252.

Elongate, nearly parallel. Pale reddish-brown, somewhat shining, thinly clothed with very fine, whitish pubescence. Beak robust, shining, sparsely punctured and pubescent, striate on basal half. Head very finely and sparsely punctate, frontal fovea small. Thorax nearly twice as wide at middle as long, scarcely constricted at apex, disc finely and rather densely punctate. Elytra one-fourth wider at base than thorax, sides straight and parallel for two-thirds their length, thence rounded to apex; striæ wide, deeply impressed, their punctures large, round, wider than the

intervals on the disc. Side pieces of thorax densely clothed with fine white hairs. Length 2 mm.

Knox County, Ind., scarce; July 1. Known elsewhere from New Jersey, Massachusetts and District of Columbia.

477 (11,026). PSEUDANTHONOMUS PARVULUS Dietz, 1891, 253.

"Similar in form and color to *longulus*. More shining, very thinly clothed with short whitish pubescence. Head sparsely punctured and pubescent. Disc of thorax rather coarsely and densely punctured. Elytra oblong, one-third wider at base than thorax; strial punctures large, rounded, subconfluent on the disc; intervals convex, narrower at base, rugulose. Length 2.2 mm." (*Dietz.*)

Described from a single female from Illinois.

478 (——). PSEUDANTHONOMUS INERMIS sp. nov.

Oblong-oval, robust. Dark reddish-brown, thinly clothed with very short yellowish, scale-like hairs, scarcely condensed on any portion of the body; scutellum white; under surface darker. Beak stout, scarcely longer than thorax, both it and head alutaceous, finely and sparsely punctate. Antennæ inserted at apical third, male, middle, female, their grooves directed beneath the eyes; second joint of funicle more slender and but little longer than third, 4—6 subglobose, the fourth slightly shorter than third, club very large, densely pubescent. Thorax a little wider than long, sides straight on basal half, then feebly rounded and converging to apex; disc not constricted, coarsely and densely punctured, each puncture enclosing a short yellow prostrate hair. Elytra oval, one-third wider at base than thorax, humeri prominent, sides feebly converging from base to apical third, then more strongly so to apex; striæ rather deep, their punctures large, not close-set; intervals convex, granulose-punctate, each puncture bearing a short yellowish hair. Abdomen finely and sparsely punctate. Length 2—2.3 mm. (*W. S. B.*)

Dunedin and Lake Istokpoga, Fla.; Feb. 25–March 23. The male has the thorax somewhat narrower, with sides almost evenly converging from base to apex. Differs from all others by the unarmed femora and the character of the pubescence. The only species of the genus so far known from Florida.

479 (11,027). PSEUDANTHONOMUS RELICTUS Dietz, 1891, 254.

Elongate, subovate. Brown, clothed with coarse yellowish-gray pubescence. Beak widened from base to apex, punctured and feebly bistriate from base to middle. Frontal fovea obsolete. Thorax coarsely and closely punctate. Elytra elongate, wider behind, but slightly wider at base than thorax; strial punctures coarse; intervals nearly flat, rugose, the third conspicuously widened at base, each with several irregular rows of minute punctures. Length 2 mm.

Described from a single male from Pennsylvania. Resembles *incipiens* but darker and the funicle only 5-jointed.

Tribe XIII. PRIONOMERINI.

Small, broad, robust species, having the beak stout, not longer than thorax; antennæ inserted about its middle, scape passing the front border of eyes, funicle 7-jointed; club very large, oval, pointed, pubescent; eyes large, rounded; thorax without postocular lobes; prosternum short, not emarginate; ventral sutures deeply impressed, all except the first angulated or projecting backwards in a point at the sides; fifth scarcely longer than fourth; legs stout, tibiæ with a slender terminal hook; tarsi dilated, spongy beneath, third joint bilobed; claws appendiculate; pygidium more or less visible.

KEY TO GENERA OF PRIONOMERINI.

a. Beak as long as thorax, subcylindrical; tooth of front thighs large, serrate. I. PRIONOMERUS.

aa. Beak short, broad, flat; tooth of thighs small, acute. II. PLAZORHINUS.

I. PRIONOMERUS Schön., 1836. (Gr., "saw" + "femur.")

Head very short, eyes approximate, scape reaching their middle; scutellum elongate-oval; front tibiæ strongly curved; tooth of front femora much wider than long, its front edge oblique, armed with six to ten small teeth.

480 (8684). PRIONOMERUS CALCEATUS Say, 1831, 15; ibid, I, 278.

Broadly oval. Black, feebly shining; antennæ and tarsi reddish-brown, club darker. Beak rather coarsely and sparsely punctate. Thorax one-third wider at base than long, strongly narrowed in front, coarsely, deeply and very densely punctate. Elytra quadrate, but little longer than wide, sides parallel to near apex, which is broadly rounded; striæ deeply impressed, coarsely punctured, intervals flat, densely granulate-punctate. Length 3—4 mm. (Fig. 87.)

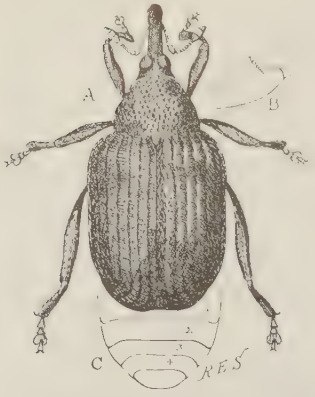


Fig. 87. A, Adult, × 1.5; B, front femur, showing large serrate tooth; C, abdomen showing the ventral segments angulate at sides. (Original.)

Lake, Marshall, Vermillion, Perry and Posey counties, Ind., scarce; probably throughout the state; May 12—July 22. Beaten from sassafras. Not rare near New York City, May—July. Lake Istokpoga, Fla., Feb. 24. Ranges from New England to Michigan, south to Florida; the larvæ mining in the leaves of sassafras and *Liriodendron*. The eggs are laid in the

midrib, several larvæ feeding side by side, making large mines which inflate when dry; pupal cells are of silk and clustered together. (*Pierce.*)

II. Piazorhinus Schön., 1836. (Gr., "burdensome" + "beak.")

Short robust species resembling the pea-weevils (Bruchidæ) in form, the antennæ feebly elbowed. Differing from *Prionomerus* in the smaller size, more widely separated eyes, shorter scutellum, shorter and flatter beak, straight front tibiæ, and by having all the femora armed with a short, minute tooth.

KEY TO SPECIES OF PIAZORHINUS.

a. Color nearly uniform black; scutellum white. 481. SCUTELLARIS.
aa. Color mainly brown.
b. Elytra with black spot or cross bands and without tubercles near middle.
c. Beak distinctly longer than wide; eyes narrowly separated. 482. PICTUS.
cc. Beak barely longer than wide; eyes separated by half their own width. 483. THORACICUS.
bb. Elytra uniform reddish-brown, each with a distinct tubercle on second interval at middle. 484. TUBERCULATUS.

481 (8685) Piazorhinus scutellaris Say, 1826, 252; ibid, II, 315.

Short, broadly ovate. Black, moderately shining, sparsely and irregularly clothed with long hairs, yellowish on the thorax, white on elytra; antennæ and tarsi pale brownish-yellow. Beak gradually widened from base to apex, finely striate, coarsely punctate. Thorax at base one-third wider than long, disc convex, coarsely and rather sparsely punctate, carinate at middle. Elytra one-third wider at base than thorax; striæ finely punctured; intervals flat, coarsely punctate. Length 2—2.5 mm.

Lake, Steuben, Posey and Perry counties, Ind., scarce; May 20—June 30. Beaten from oak. Bowmanville and Evanston, Ill., June 13—August 10. Connecticut, New York and New Jersey, May to September. Ranges from New England to Michigan and Nebraska, south to Georgia. Say records it from *Kalmia latifolia* L.; Ulke as very common on bushes, and Harrington from hickory. In fresh specimens the white hairs of elytra are arranged in three more or less distinct cross-bars, median, postmedian and subapical, the median one very undulating.

482 (8686). Piazorhinus pictus Lec., 1876, 211.

Form of *scutellaris*. Brownish-yellow, clothed with long pale yellowish hairs, more dense on occiput, thorax and humeri; head and beak usually dusky; elytra with large, rounded common dusky spot extending from base to middle, paler within, and a dusky oblique band, more or

less interrupted on the seventh interval, which reaches the suture about one-fourth from tip. Beak shorter, broader, more finely sculptured than in *scutellaris*. Thorax less narrowed in front, finely and densely punctured, and with a short median carina. Punctures of elytral striæ finer, close-set; intervals wide, flat, each with a single row of coarse, close-set punctures. Length 2—2.5 mm.

Marshall County, Ind., scarce; June 11—12. Edgebrook, Ill., June 20. Recorded from numerous places in New Jersey, but always rare. Watchogue, Staten Island, Nov. 21. Dunedin, Fla., Feb. 29—March 21. Ranges from Canada and New Jersey to Wisconsin, south to Florida. On oak during June in Pennsylvania. (*Hamilton.*) The black spot of elytra varies much in size, in two Florida specimens being almost obsolete, is usually pale at center and is sometimes represented by two or three dark irregular cross bands ending on the sides in a small white spot.

483 (——). PIAZORHINUS THORACICUS Casey, 1910, 128.

"Form, coloration and vestiture as in *pictus* but slightly narrower, the beak still wider, barely longer than wide, broad and flat; eyes but feebly convex, separated on the front by fully half their own width; thorax relatively much larger and less transverse, nearly half as long and four-fifths as wide as elytra, the converging sides from base to apex more arcuate; elytra nearly similar in ornamentation, but with striæ much finer. Length 2.4 mm." (*Casey.*)

Palm Beach, Florida.

484 (——). PIAZORHINUS TUBERCULATUS sp. nov.

Form of *scutellaris*. Uniform dark reddish-brown, thinly clothed with rather short whitish hairs which are feebly condensed along the median line of thorax and on the scutellum; antennæ and legs pale reddish-brown. Beak flat, scarcely longer than wide at apex, rapidly widening from base forwards, almost smooth and glabrous. Thorax shorter and broader than in the other species, one-half wider than long, sides feebly curved from base to apical third, then strongly converging to apex; disc densely and coarsely granulate-punctate. Elytra widest at humeri, their base scarcely wider than thorax, sides broadly and feebly curved from humeri to the separately rounded tips; disc evidently, but feebly, declivous from the tubercles at middle to base; striæ rather coarse, finely and closely punctate; intervals finely and densely punctate. Second, third and fourth ventrals narrower and more convex than in *pictus* or *scutellaris*, their sutures very deep. Length 2—2.2 mm. (*W. S. B.*)

Lake Okeechobee, Fla., March 7. Taken by sweeping. One specimen is in the Horn collection from Biscayne Bay, Fla. Very distinct in color, short broad beak, tubercles of elytra and form of ventral segments.

Tribe XIV. MECININI.

Small, broadly oval, robust species, having the funicle of antennæ with but five joints; beak cylindrical, antennæ inserted at apical third; scape reaching the eyes which are oval, transverse and widely separated; front coxæ large and prominent; ventral segments not very unequal in length, the third and fourth slightly shorter; tarsal claws simple. Nine species, belonging to four genera, represent the tribe in this country. Six of these are known from our territory, while one is a European species recorded once only from Louisiana.

KEY TO GENERA OF MECININI.

a. Pygidium covered (Cionini of European authors.)
b. Antennal club with joints distinct; femora not toothed.
I. Nanophyes.
bb. Antennal club merely annulated; femora strongly toothed.
II Cionus.*
aa. Pygidium exposed; antennal club annulated.
c. Front coxæ contiguous; tarsal claws connate; beak short, stout, tapering. III. Gymnetron.
cc. Front coxæ separated; claws free; beak long and slender.
IV. Miarus.

I. Nanophyes Schön., 1837. (Gr., Nanus + "similar.")

One introduced European species represents this genus in our territory.

485 (8703). Nanophyes pallidulus Grav., Zool. Syst., 1807, 203.

Oval, convex, robust. Reddish-brown, thinly pubescent with long yellow hairs; head, beak, a triangular spot on basal third of elytra, and a small postmedian spot on each darker. Thorax strongly narrowed from base to apex. Elytra very convex, striæ deep, intervals convex. Length 2.3—2.7 mm.

One specimen in the Horn collection from New Jersey. Recorded also from Louisiana and Colorado. Introduced from Europe, where it occurs in Italy and southern France. Bedel doubts the correctness of the determination of the American species.

III. Gymnetron Schön., 1826. (Gr., "naked" + "belly.")

Beak nearly straight, as long as thorax, tapering from base to apex, scaly on basal half, smooth, striate, finely and sparsely

**Cionus scrophulariæ* Oliv. Black, the thorax, a humeral mark, body beneath and legs clothed with yellow hair; elytra brown with two black sutural spots, the alternate intervals elevated, tessellated black and white. Recorded from Louisiana by Summers; also taken by Say (1831, 21) without definite locality. A European species which attacks the fruit of the plum, the larvæ feeding on the kernel.

punctate in front of antennæ; first joint of funicle two-thirds longer than second, the latter slightly longer than third, 3—5 equal; club short, oval; head short, immersed in thorax nearly to the eyes. This genus and the next alone constitute the tribe *Mecinini* of Reitter.

486 (8705). GYMNETRON TETRUM Fab., 1801, 448.

Broadly oval, very robust. Black, subdepressed, densely clothed with suberect yellowish-gray pubescence. Thorax more than twice as wide as long, sides broadly rounded, apex less than one-half as wide as base, disc finely and densely punctured. Elytra but slightly wider at base than thorax, sides broadly curved from base to apex; striæ deep, coarsely punctured; intervals flat, finely and densely rugosely punctate. Femora stout, toothed beneath. Length 2.3—3.7 mm. (Fig. 88.)

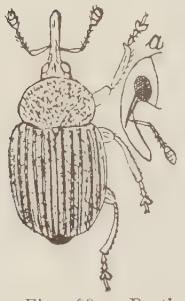


Fig. 88. Beetle × 8. *a*, Side view of head, beak and antennæ. (After Kuhnt.)

Common throughout Indiana; Feb. 2—Nov. 1. Hibernates in numbers beneath the basal leaves of mullein, *Verbascum thapsus* L., on which plant it swarms in summer, the larvæ living in the seed pods. Very common near New York City in May and June, occasionally until August, on mullein. Ranges from Canada and New England to Iowa, north of Georgia and Arkansas; also throughout middle and southern Europe and Siberia. Easily known by its 5-jointed funicle, broad, subdepressed form and hirsute appearance.

IV. MIARUS Steph., 1831. (Gr., "maculate.")

Small hirsute species differing from *Gymnetron* in having the beak long and slender, usually extending beyond the middle coxæ and lying in a groove between the front ones in repose; femora, in our species, not toothed, tibiæ not armed, tarsal claws free.

KEY TO EASTERN SPECIES OF MIARUS.

a. Surface lustre feebly bronzed; sides of thorax converging from base to apex, but only feebly curved. 487. HISPIDULUS.

aa. Surface deep black throughout, not at all bronzed.

b. Larger, 2.3 or more mm.; sides of thorax strongly curved.

c. Form oval, robust, convex; thorax two-thirds wider than long. 488. PURITANUS.

cc. Form very elongate-oval; thorax scarcely one-half wider than long. 489. ILLINI.

bb. Smaller, not over 1.8 mm.; sides of thorax feebly curved. 490. NANUS.

487 (8706). MIARUS HISPIDULUS Lec., 1876, 221.

Ovate, convex. Black with a feeble bronzed tinge, thinly clothed with grayish erect hairs; sides of sterna densely clothed with small, oval, silvery-

gray scales; legs dark reddish-brown. Beak smooth, striate and feebly punctured near base. Thorax two-thirds wider than long, sides feebly rounded and strongly converging from base to apex, disc densely, finely and shallowly punctured. Elytra slightly wider at base than thorax, shining; striæ deep, feebly punctured; intervals flat, each with two rows of punctures bearing suberect gray hairs. Length 2 mm.

Marion and Hamilton counties, Ind., rare; June 26—August 18. Several localities in New Jersey, June to August. Ranges from Quebec and New England to Illinois, Florida and Texas. Breeds in the seed capsules of Indian tobacco, *Lobelia inflata* L. (*Blanchard*); and in those of the great lobelia, *L. syphilitica* L. (*Ulke.*)

488 (——). Miarus puritanus Casey, 1910, 144.

Oval, convex. Deep black without lustre; thorax clothed with short, erect gray hairs; elytra with long sparser paler ones, interlacing across the suture near apex; antennæ and tarsi reddish-brown; scutellum white Thorax with sides strongly converging from base to apex, disc rather coarsely, very densely punctate. Elytra oblong-oval, slightly longer than wide, much wider than thorax; striæ rather fine and shallow, distinctly not coarsely punctate; intervals wide, flat, feebly punctate. Length 2.3—2.7 mm.

Putnam County, Ind., rare; July 29. Casey's type was from Massachusetts.

489 (——). Miarus illini Casey, 1910, 144.

Elongate-oval, convex. Black, clothed with short erect, very stiff dusky-gray hairs. Beak much longer than head and thorax, slender, feebly curved, the antennæ inserted slightly beyond basal third. Thorax rather finely, densely punctate, the converging sides strongly curved. Elytra one-fifth wider than thorax and one-fifth longer than wide; striæ very fine, rather remotely and finely punctate; intervals flat, shining, sparsely subrugosely punctate. Sides of sterna densely clothed with brownish-gray, plumulose scales. Length 2.4 mm.

Illinois.

490 (——). Miarus nanus Casey, 1910, 144.

Elongate-oval. Black, thorax thinly clothed with short erect hairs; elytra with sparse longer yellowish-gray ones, antennæ and tarsi reddish-brown. Thorax nearly three-fourths wider than long, sides strongly converging from the base, disc coarsely, less densely punctate than in *puritanus*. Elytral striæ much deeper than there, strongly not coarsely punctate; intervals narrower, less flat, shining, very finely and sparsely punctate. Length 1.8 mm.

Massachusetts.

Tribe XV. CLEONINI.

In this tribe the elytra extend but feebly over the flanks of the metathorax and abdomen, so that the angles on the sides of the first ventral segment of the latter are uncovered and visible. The body is never very stout, but usually elongate and more or less subcylindrical; mentum large, flat; antennæ elbowed, sometimes feebly so, joints of funicle gradually broader, club elongate-oval, annulated, pubescent and sensitive; tibiæ more or less spined at tips, their articular surface on the sides, corbels wanting; tarsi in our species with brushes or pads of yellowish-brown pubescence beneath, their claws connate or approximate at base. In Indiana the adults are mostly found in the vicinity of water, the larvæ of a number of species feeding upon different kinds of smartweed (*Polygonum*), others upon dock, ragweed and wild sunflower. The tribe has been reviewed by

Casey, T. L.—"Coleopterological Notices, III—Cleonini," *in* Ann. N. Y. Acad. Sci., VI, 1891, 176—213.

KEY TO EASTERN GENERA OF CLEONINI.

a. Beak short, flat, stout, strongly carinate, somewhat dilated at tip; thorax angulated at sides, constricted near apex; third joint of hind tarsi emarginate, not spongy beneath. I. STEPHANOCLEONUS.

aa. Beak cylindrical, not or feebly dilated at tip; thorax not angulated at sides; third joint of hind tarsi usually bilobed and spongy beneath.

b. Beak shorter, stouter, more densely pubescent and often feebly dilated at tip; form usually stouter; pubescence usually arranged in stripes. II. CLEONUS.

bb. Beak longer, more slender, more curved and not dilated at tip; form less stout, often very slender; pubescence not or rarely in stripes. III. LIXUS.

I. STEPHANOCLEONUS Motsch., 1860. (Gr., "crown of Cleonus.")

Antennæ stout, feebly elbowed; first joint of funicle longer, second equal to third, seventh forming part of club; tarsi hairy, not spongy beneath, the hind ones with first and second joints elongated.

491 (8513). STEPHANOCLEONUS PLUMBEUS Lec., 1876, 146.

Elongate, robust. Black, thinly clothed with very short, fine, whitish pubescence, producing a leaden lustre; elytra with two faint oblique denuded bands, and a small polished spot near tips. Beak stout, shorter than thorax, finely and confluently punctured, its median carina high, curved, not reaching tip but extending onto head. Thorax quadrate, suddenly narrowed near apex, sides nearly parallel, base broadly biemarginate; disc finely and densely punctured, with large scattered punctures intervening, carinate in front of middle, impressed behind. Elytra with humeri obliquely truncate, sides subsinuate, obliquely prolonged behind; striæ coarsely and closely punctate; intervals flat, densely and finely punctured. Length 9—11 mm.

Durham and East Wakefield, N. H., May. 15. Meriden, Conn. Ranges from Maine to the north shore of Lake Superior, Telegraph Creek, B. C., southern Colorado and New Mexico.

II. Cleonus Schön., 1826.

The differences between this genus and the next are difficult to state. Casey says that the species of *Lixus* "form a very homogeneous assemblage, distinguishable at once from *Cleonus* by the longer, more slender, cylindrical and less pubescent beak in which the modifications due to sex are much more apparent than in the latter genus." While that may be true where one has a large assemblage of species at hand, it is difficult to set forth in a key any definite character which sharply defines the two genera and which will enable the student to separate isolated forms. Dr. E. A. Schwarz, the Nestor of living American Coleopterists, in a recent letter to the writer said: "No one has hitherto been able to point out any generic differences between *Lixus* and *Cleonus*, but they differ in habitus and mode of life." The differences between the two genera as set forth in the key are the only ones given by both LeConte and Casey, but they are gradational and not fixed.

Fig. 89. Cleonus [illegible] Chev. ×3. (After Chittenden.)

KEY TO SPECIES OF CLEONUS.

a. Second joint of funicle distinctly shorter than first; beak stout, two-thirds or more the length of thorax.

b. Body stout, elongate-oval; beak distinctly dilated at apex; thorax and elytra each with four broad stripes of gray pubescence; length 12—14 mm. 492. CARINICOLLIS.

bb. Body more slender, subparallel; beak less stout, not at all dilated at apex. (Fig. 89.)

c. Elytra nearly uniformly densely clothed with ash-gray pubescence, sometimes with a narrow subsutural and wider submarginal stripe more sparsely pubescent; beak finely and densely punctate; length 9—10 mm. 493. CALANDROIDES.

cc. Elytra rather sparsely pubescent, more densely so along the sides; beak more coarsely, less densely punctate.

d. Beak distinctly carinate, separated from the head by a deep transverse groove; thorax with four stripes of denser, paler pubescence. 494. FRONTALIS.

dd. Beak not or feebly carinate, the transverse groove at base absent; thorax with pubescence evenly distributed. 495. SUBCYLINDRICUS.

aa. Second joint of funicle subequal to first; beak very short and thick, less than half the length of thorax, the latter densely and coarsely granulose. 496. GRANIFERUS.

492 (8525). CLEONUS CARINICOLLIS Lec., 1876, 152.

Elongate-oval, robust. Black, shining; beak, four broad stripes on thorax and elytra and entire under surface rather thickly clothed with short gray pubescence, one of the two pale stripes on each elytron marginal, the other between the first and fifth rows of punctures, the two confluent or almost so at base. Beak stout, three-fourths as long as thorax, coarsely and sparsely punctate, with much finer punctures intervening, an obtuse median carina on middle portion ending in an elongate fovea in front, base with a rather deep transverse impression. Thorax as long as wide, sides almost straight from base to middle, then feebly curved and converging but not constricted to apex; disc very coarsely, sparsely and unevenly punctate and with a broad, deep fovea in front of scutellum, the intervals between the coarse punctures, and a median smooth line extending from apex to basal fourth, minutely punctulate. Elytra at base only about one-fourth wider than thorax, humeri small, rounded, sides parallel for three-fourths their length, then converging to the rounded apex; disc with a broad, feeble impression behind the scutellum and another near the humeri; striæ with very coarse, close-set punctures, their intervals minutely and shallowly punctate. Under surface very coarsely and sparsely punctate. Third joint of hind tarsi densely spongy beneath, deeply emarginate, feebly bilobed. Length 12—14 mm.

Ormond, Fla., Apr. 4. Southern Pines, N. C., Apr. 17. Described from Colorado. Much more robust than our other eastern species.

493 (8527). CLEONUS CALANDROIDES Rand., 1838, 42.

Elongate-oblong, robust. Black, densely clothed with long, fine ash-gray hairs, those of thorax usually so condensed as to form four stripes, these separated by narrow stripes of more sparse pubescence; antennæ and tarsi dark reddish-brown. Beak with a fine carina reaching from frontal fovea to antennæ. Thorax as broad at base as long, sides nearly parallel from base to beyond middle, thence gradually converging to apex; disc very coarsely and rather closely punctate, the intervals between the punctures minutely punctulate; median line with a fine carina on apical half, rather widely and deeply depressed behind the middle. Elytra slightly wider near base than thorax, sides parallel for four-fifths their length, thence converging into a bluntly rounded apex; strial punctures rather fine, somewhat distant. Under surface densely pubescent, coarsely punctate. Length 9.5—10 mm.

Tyngsboro and other points in eastern Massachusetts near the coast and on Nantucket Island; May 23—Oct. 10. Found also at East River, Conn., and Wading River, L. I. The larvæ breed in the stems and feed on the leaves of the sea rocket, *Cakile edentula* Bigel.

494 (8520). Cleonus frontalis Lec., 1876, 150.

Elongate, subparallel, rather slender. Black, shining; above rather thickly clothed with yellowish-gray pubescence which covers the beak, forms four broad stripes on thorax and a lateral and median stripe on each elytron, the interval between the elytral stripes thinly pubescent, mottled with denser spots. Beak two-thirds as long as thorax, coarsely and sparsely punctate. Thorax as long as wide at base, sides almost parallel from base to middle, then strongly converging to apex; disc very coarsely and sparsely punctured and with a smooth median line extending from apex to a broad, rather deep basal fovea. Elytra with base and sides as in *calandroides;* disc with three broad basal impressions, striæ with moderately large, somewhat distant punctures. Under surface coarsely and sparsely punctate, densely pubescent. Third joint of hind tarsi spongy only at margin, deeply and narrowly bilobed. Length 9 mm.

Specimens labelled Illinois are in the Cambridge collection. Described from Nevada and Wyoming.

495 (10,872). Cleonus subcylindricus Casey, 1891, 193.

Elongate, subcylindrical, convex. Black, elytra shining, above sparsely clothed with very short gray hairs, condensed on sides of thorax and elytra. Beak short, robust, about two-thirds the length of thorax, almost glabrous, not carinate. Thorax about as long as wide, sides feebly curved, disc almost glabrous except on sides, not carinate, coarsely, sparsely and unevenly punctate, the intervals finely and very densely punctulate; median basal impression very feeble. Elytra at base very slightly wider than thorax; disc punctate as in *calandroides*. Hind femora much longer than the tibiæ. Length 10.5 mm.

Described from Florida.

496 (10,873). Cleonus graniferus Casey, 1891, 194.

Form of preceding. Black, shining, rather sparsely clothed with short gray hairs, denser in narrow stripes on the alternate intervals of elytra and a broad marginal stripe on sides of thorax and elytra. Beak scarcely more than half the length of thorax, sparsely punctate, not carinate, separated from head by a deep, transverse groove, and with a deep fovea between the antennæ. Thorax about as long as wide, sides feebly curved, not impressed on median line, densely covered with small irregular, shining, tubercles. Elytra with disc coarsely tuberculose and roughened near base, finely and densely punctate, the strial punctures rather coarse. Length 12 mm.

Described from Georgia.

III. Lixus Fabr., 1801. (Gr., "color of ashes.")

Elongate, subcylindrical species of medium or large size having the antennæ slender, the first joint of funicle thicker, the second usually as long or longer than the two following united; beak slender, not thickened at tip and very rarely carinate;

thorax oblong, conical, its base bisinuate; scutellum minute, triangular; elytra elongate, subcylindrical, as wide at base as thorax, their sides usually continuous, humeri obtusely subangulate; tarsi broad, spongy beneath, with the third joint deeply bilobed.

Schönherr, who founded the genus *Cleonus*, states (1836, 2) that *Lixus* differs from it chiefly in having the "antennis pone medium, haud apici rostri insertis, tenuioribus; rostro tereti, lævi, nec distincte carinato neque canaliculato; corpore etiam sæpissime minus crasso," but as will be seen, these distinctions do not apply to a number of our species accredited to *Lixus*. For example, the point of insertion of the antennæ is a sexual rather than a generic character, as they are almost always inserted nearer the apex in the male than in the female. Again, certain of our species have the beak distinctly carinate, while others have the body as stout as in any species of *Cleonus*.

Most of the species, when fresh, are covered with a pollen-like yellowish powder which is easily rubbed off, and many of them are pubescent. They are stem weevils, the larvæ frequently causing an elongate, gall-like swelling of the stems of various plants. Pupation takes place in the burrow or gall, and there is generally only one generation a year. The texture of the elytra is remarkably hard, it being very difficult to impale them with ordinary insect pins. About 40 species of *Lixus* are known from the United States, 21 of which occur in our territory. For convenience they are separated into two groups:

KEY TO GROUPS OF EASTERN SPECIES OF LIXUS.

a. Second joint of funicle either shorter or subequal in length to the next two combined. GROUP I, p. 332.

aa. Second joint of funicle slender, distinctly longer than the next two combined; elytra usually more or less finely mottled with ash-gray pubescence. GROUP II, p. 340.

GROUP I.

KEY TO SPECIES OF GROUP I.

a. Tips of elytra prolonged in short, rather acute, feebly diverging processes.

b. Form stout; color black; first joint of funicle very short, not as long as third and fourth combined. 497. CAUDIFER.

bb. Form slender; color reddish-brown; first joint of funicle equal to third and fourth combined. 498. RUBELLUS.

aa. Tips of elytra not prolonged.

c. Elytra and thorax with a narrow, abruptly limited, densely pubescent marginal pale stripe.

d. Thorax distinctly impressed on basal half; size larger, 8 or more mm.

e. Basal impression of thorax broad, ill defined; beak with a fine but distinct carina; form robust; elytra without pubescent white spots. 499. LUPINUS.

ee. Basal impression of thorax deep, sharply limited; beak wholly without carina; form more slender; elytra with pubescent white spots. 500. AMPLEXUS.

dd. Thorax not impressed on basal half; smaller and more slender, not over 7 mm. 501. LEPTOSOMUS.

cc. Elytra, and often the thorax, without distinct marginal stripes of pale pubescence.

f. Form short, broad, more or less oval, elytra never more than twice as long as wide; length less than 9 mm.

g. Beak finely but distinctly carinate; elytra with a deep, parallel-sided basal impression. 502. MARGINATUS.

gg. Beak not at all carinate.

h. Beak very finely and rather densely punctate; elytral punctures separated by twice or more their own diameters. 503. MUSCULUS.

hh. Beak rather coarsely and roughly punctate; elytral punctures separated by scarcely more than their own diameters. 504. PUNCTINASUS.

ff. Form elongate, generally subparallel, the elytra distinctly more than twice as long as wide.

i. Thorax broadly flattened and impressed throughout its length or nearly so, the impression always deeper on basal half; length 9.5 or more mm.

j. Form more slender; beak very slender in female, longer than thorax; elytral impression deep. 505. CONCAVUS.

jj. Form robust; beak stout, subcarinate, subequal in length to thorax in both sexes; elytral impression not deep. 506. MUCIDUS.

ii. Thorax impressed only near base.

k. Beak not at all carinate; vestiture of elytra hair-like; thorax very coarsely cribrate-punctate; length less than 9.5 mm.

l. Beak very long and slender, as long as thorax in male, longer in female; thorax with sides feebly rounded in front. 507. SYLVIUS.

ll. Beak short and stout, distinctly shorter than thorax in both sexes; thorax with sides parallel on basal three-fourths. 508. SCROBICOLLIS.

kk. Beak distinctly carinate; vestiture of elytra scale-like; length 10—10.5 mm. 509. MORULUS.

497 (8489). LIXUS CAUDIFER Lec., 1876, 156.

Elongate, narrowly oval, robust. Black, everywhere densely clothed with fine, short, gray pubescence; antennæ and tarsi dark reddish-brown. Beak slender, shorter than thorax, its apical third polished in male. Second joint of funicle slightly longer than third and fourth united. Thorax conical, at base slightly wider than long, sides gradually converging to apex;

disc finely and densely punctate, with scattered larger shallow punctures intermixed, and with a large, deep, triangular median impression reaching from base almost to apex. Elytra with sides parallel for three-fourths their length, then converging to the prolonged tips; median basal impression long, shallow; strial punctures rather large, distant; intervals and under surface finely and densely punctate. Length 10—14 mm.

Lake County, Ind., rare; May 25. Recorded from Wisconsin, Illinois, Iowa and British Columbia. A striking and easily recognized species. No record of its food habits can be found.

498 (8487). LIXUS RUBELLUS Rand., 1838, 41.

Elongate, slender. Upper surface, antennæ and legs uniform reddish-brown, sparsely clothed with very short, fine gray pubescence. Beak slightly shorter than thorax, finely and densely punctured; front with median fovea. Thorax longer than wide, gradually narrowed from base to tip, sides nearly straight; disc finely and densely rugosely punctate, and with a wide, elongate median impression reaching from base nearly to apex. Elytra flattened but not distinctly impressed behind the scutellum, sides as in *caudifer*, strial punctures large, not distant. Length 7.5—9.5 mm.

Lake Co., Ind., rare; June 10. Taken from beach of Lake Michigan. Known from Quebec and Massachusetts to Wisconsin, and probably occurs only in the Transition Life Zone. Observed by Lintner in numbers on the flowers of the water persicaria or smartweed, *Polygonum amphibium* L., in Massachusetts.

499 (——). LIXUS LUPINUS Blatch., 1914, 248.

Elongate, cylindrical, robust. Black, shining, evenly and rather thickly clothed with a fine, prostrate, gray pubescence which, on the sides of the thorax and elytra, is condensed into a rather broad, prominent marginal stripe. Beak short (2.3 mm. from eye to tip), stout, cylindrical, coarsely, closely and deeply punctate and with a fine but distinct carina reaching three-fourths to tip. Antennæ stout, inserted one-third from tip, the second and third joints of funicle subequal, the two together slightly longer than the first. Thorax as long as wide, sides parallel from base to middle, thence gradually converging to apex, the latter feebly bisinuate; disc with numerous very coarse shallow punctures, somewhat irregularly placed, their intervals finely reticulate-punctate, without median impressed line but with a broad, shallow depression in front of scutellum and a fine carina on apical third. Elytra three times longer than thorax and one-fourth wider at base, sides parallel for three-fourths their length, thence feebly converging into a rounded apex; disc with a large shallow concavity behind the scutellum and with regular unimpressed rows of rather large distant punctures, their intervals finely granulate-punctate. Abdomen densely pubescent, finely and densely punctate, with numerous scattered very coarse punctures. Length 11—13 mm.

Quite frequent on the flowers of the hoary lupine, *Lupinus diffusus* Nutt., near Dunedin, Fla.; Jan. 16—October 25. Resembles *placidus* Lec., but that species is from Colorado and has

the first and second joints of funicle equal and the thorax channeled for two-thirds its length. In fresh specimens of *lupinus* the pubescence of beak, thorax and elytra is so dense as to almost conceal the surface sculpture.

500 (10,845). Lixus amplexus Casey, 1891, 199.

Elongate, cylindrical, rather slender. Black, shining, sparsely clothed with very short white pubescence which is condensed to form scattered small spots on elytra and marginal stripes on thorax and elytra as mentioned in key; antennæ reddish-brown. Beak feebly curved, rather stout, about three-fourths as long as thorax, both it and head finely, rather sparsely punctate. Thorax as wide at base as long, sides nearly parallel on basal three-fourths, thence rapidly converging to apex; disc very coarsely and sparsely punctate, the intervals between the punctures alutaceous and finely punctate, the sides more rugosely punctate than disc. Elytra with basal impression continuous with that of thorax, large and deep; disc with unimpressed rows of rather large and very distant punctures. Length 8.2—9.5 mm.

Described from Florida. Frequent near Sarasota, Feb. 13—27, on the flowers of the large purple thistle, *Carduüs spinosissimus* Walt.

501 (——) Lixus leptosomus Blatch., 1914, 249.

Elongate, cylindrical, very slender. Black, shining, very sparsely clothed with fine gray pubescence except along the sides of the thorax and elytra, where it forms a narrow but conspicuous stripe; antennæ and tarsi reddish-brown. Beak short, stout, cylindrical, densely and finely reticulate-punctate, feebly carinate. Antennæ inserted at middle of beak, the first joint of funicle stouter but subequal in length to second, which is one-half longer than third. Thorax cylindrical, one-fourth longer than wide, base and apex truncate, disc without smooth median line or basal impression, coarsely and sparsely punctate, the intervals with very fine sparse punctures. Elytra at base not wider than thorax, two and one-third times as long, sides parallel for four-fifths their length, thence gradually converging to a subacute apex; disc with rows of small, distant punctures, the intervals very finely and sparsely punctate. Abdomen densely pubescent, finely and sparsely punctate. Length 7 mm.

Sanford, Fla., April 9. One specimen swept from low herbage along the border of a cypress swamp. The only other described species to which it appears to be closely allied is the Texan species *L. tenellus* Casey, from which it differs in the relative length of antennal joints, in the beak being densely instead of "extremely sparsely" punctate and in the relatively longer thorax and greater length of body.

502 (8505). Lixus marginatus Say, 1831, 13; ibid, I, 275.

Elongate-oval, rather robust. Black, sparsely clothed with minute grayish hairs which are often condensed along the sides of the thorax and elytra to form a faint but evident pale stripe; antennæ reddish-brown, club

dusky. Beak about as long as thorax, cylindrical, strongly curved, rather deeply punctate; front with a distinct fovea. Thorax subconical, slightly longer than wide at base, sides parallel from base to middle, thence converging to apex; disc with dilated, confluent, feebly impressed punctures, the median impression on basal half not deep. Elytra with sides parallel for three-fourths their length, thence converging to the separately rounded tips; disc with rows of rather large, round, close-set punctures. Length 7.4—8.5 mm.

Perry County, Ind., rare; May 23. Sanford, Fla., April 4. Ranges from New Jersey and Pennsylvania to Iowa and Florida.

503 (8499). Lixus musculus Say, 1831, 14; ibid, I, 276.

Oblong-oval, robust. Black, sparsely clothed with fine gray hairs, antennæ piceous. Beak shorter than thorax, stout, densely punctate. Thorax short, slightly wider at base than long, sides feebly converging from base to apex; disc impressed before and behind the middle, coarsely and sparsely punctate, the intervals between the large punctures finely punctulate. Elytra with sides as in *marginatus*, their tips subacute; disc with rows of small, deep, distant punctures and with a broad shallow impression behind the scutellum. Length 7.2—8.5 mm.

Lake County, Ind., scarce; May 12—20. Throughout New Jersey and at many localities near New York City; April—Sept. Dunedin, Sanford, Sarasota, Crescent City and Lake Poinsett, Fla., Jan. 1—April 4. Ranges from Canada and New Jersey to Texas and Colorado. Reared from *Polygonum amphibium* L. in Michigan by Kellicott, and from *P. pennsylvanicum* L. in Texas by Pierce, who states (1907, 261) that the eggs are laid in the stems near the joints and cause a cylindrical gall above the joint, thus giving the larvæ sufficient space to develop. The galls are twice the diameter of the stem and about three-fourths of an inch long. The larvæ, while in the cells, are attacked by a number of primary parasites. When mature, the adults completely fill the cells, and escape by gnawing a round hole in front of the head. They frequently hibernate within the cells.

504 (8493) Lixus punctinasus Lec., 1876, 157.

Elongate-oval, robust. Black, antennæ, tibiæ and tarsi reddish-brown; above and beneath thinly clothed with fine yellowish-gray pubescence. Beak stout, cylindrical, as long as thorax, much more coarsely and roughly punctate than in *musculus;* antennæ inserted at its apical fourth; frontal fovea small, distinct. Thorax slightly wider than long, sides parallel on basal third, disc much narrowed in front, coarsely shallowly and rugosely punctate, basal impression rather small, not deep. Elytra at base not wider than thorax, separately rounded at tips; disc with rows of rather small, close-set punctures, median basal impression shallow, the lateral ones deep. Under surface finely and sparsely punctate. Length 8 mm.

Starke Co., Ind., rare; June 7. The more strongly punctate beak and more closely placed punctures of elytra easily distinguish this from *musculus*. The type was from Ohio.

505 (8498). Lixus concavus Say, 1831, 14; ibid, I, 275.

Elongate-cylindrical, robust. Black, sparsely and evenly clothed with very short, fine, ash-gray pubescence, and when fresh thickly covered with a rust colored pollen; antennæ and tarsi reddish-brown. Beak finely and densely punctate. Thorax slightly wider at base than long, sides feebly rounded, distinctly constricted near tip, converging from basal third to apex; disc sparsely and rather coarsely punctate, the intervals between the punctures very finely punctulate, and with a large, gradually deeper medial impression extending from near apex to base and continuous with that of elytra. Elytra long, sides parallel for four-fifths their length; disc with rows of small, somewhat distant punctures; intervals finely and densely punctate. Length 10—13.5 mm. (Fig. 90.)

Common throughout Indiana, more so in the southern counties; March 19—August 2. Occurs, especially on the curled or sour dock, *Rumex crispus* L., mating May 29; also on the arrow-arum, *Peltandra virginica* L. Common near New York City, May to September. Ranges from New England to Idaho, south to Louisiana and Florida. Breeds in the stems of dock, sunflower and thistle, the pupal cells being made in the stems just below the surface of the earth. Known as the "rhubarb curculio," as

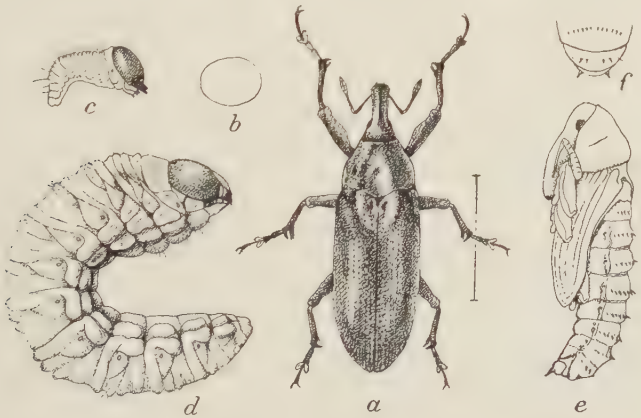


Fig. 90. *Lixus concavus* Say. *a*, Beetle; *b*, egg; *c*, newly hatched larva; *d*, full grown larva; *e*, pupa; *f*, last abdominal segments of pupa. All × 3. (After Chittenden.)

the adults, according to Chittenden (1900, 61), often attack and puncture holes in the stems of rhubarb or pie-plant, *Rheum rhaponticum* L., causing the juice to exude and the stem to die. Eggs are often laid in these holes, but the larvæ there hatched fail to mature. The adults hibernate, mate in early spring and

the season's brood emerges in late summer. *L. rectus*, Lec., (recorded from Lake Harney, Fla., by Schwarz) is said by Casey to be based on a small female of *concavus*. The latter is easily known from all other Lixi by its large size, rather slender body and the very deep common dorsal cavity of thorax and elytra.

506 (8497). LIXUS MUCIDUS Lec., 1876, 158.

Elongate, cylindrical, much more robust than *concavus*. Black, densely and very evenly clothed with short, fine, ash-gray pubescence. Beak stout, strongly curved, densely and finely punctate, finely carinate behind the antennæ. Thorax as in *concavus*, a little shorter, not constricted at tip; disc with fewer coarse punctures and with the median impression less elongate. Elytra slightly wider than thorax, the basal impression much more shallow than in *concavus*, the tips separately subacute. Length 12—15 mm.

Throughout Indiana, but much less frequent than *concavus*; Feb. 21—Oct. 16. Hibernating in numbers beneath logs on sandy hillsides on the dates given. Taken from stems of grasses along borders of marshes in summer. Bred from sour dock by C. M. Weed and recorded by him as also attacking rhubarb, and by Webster as puncturing and eating out the heart of the stems of young corn. Recorded only from Ohio, Indiana and Illinois. Our most robust species of *Lixus*, but surpassed in length by *L. fimbriolatus*.

507 (8491). LIXUS SYLVIUS Boh., Schn., 1843, II, 430.

Elongate, slender. Black, rather sparsely and unevenly clothed with rather long, fine, grayish hairs, somewhat condensed on sides and middle of thorax and elytra; antennæ reddish-brown. Beak as described in key. Thorax conical, as wide at base as long, sides parallel on basal two-thirds, thence rounded to the constricted apex; disc very coarsely and rather sparsely punctate, the intervals between the punctures minutely punctulate, the median impression on basal third distinct but rather shallow. Elytra with sides parallel for four-fifths their length, thence converging and compressed to the separately subacute tips; disc with rows of large punctures, separated by almost their own diameters, the sub-basal impression broad, rather shallow. Under surface of head, pro- and mesosterna and sides of abdomen densely clothed with long yellowish hairs. Length 7—9.3 mm.

Southern half of Indiana, scarce; May 23—July 22. Taken by sweeping roadside herbage. Ranges from Pennsylvania and District of Columbia west and south to Kentucky and Florida. Breeds in the stems of the ragweeds, *Ambrosia trifida* and *artemisiæfolia* L. This is the *scrobicollis* of LeConte nec Boh.

508 (8501). Lixus scrobicollis Boh., Schön., 1836, 84.

Form and size of *sylvius*. Black, sparsely clothed with gray pubescence which is condensed to form a more or less distinct pale stripe on sides of thorax and faint ones on elytra, these stripes often discolored by rust-red pollen-like grains. Beak subcylindrical, much shorter, stouter and more coarsely punctate than in *sylvius*. Thorax narrower, scarcely as wide at base as long, sides parallel from base to apical fourth, thence suddenly narrowed and feebly constricted to apex; disc punctate much as in *sylvius*, the coarse punctures fewer and more scattered; the basal median impression less deep. Elytral punctures somewhat coarser and more close-set; disc with basal impression wider and more shallow. Under surface less pubescent. Length 6.5—9 mm.

Southern third of Indiana, scarce; Kosciusko County only in the north; March 25—July 13. Taken by sweeping in low moist ground. Ranges from Virginia to Arkansas, Florida and Texas. Recorded by Pierce (1907, 261) as breeding in ragweed in Texas, the eggs being laid in long rows up and down the stalk, the rough scars on the outside denoting their location. The larvæ hollow out the entire stem, within which they hibernate, the adults emerging in April and May.

The three species, *marginatus*, *sylvius* and *scrobicollis*, resemble each other very closely. The first named may be separated by its carinate beak, shorter and broader elytra and less coarsely punctate thorax; *sylvius* by its long slender beak, and by having the thorax more distinctly rounded on sides and more constricted at apex, and *scrobicollis* by its short, stout beak, narrow and parallel sided thorax with more distinct pubescent stripe on its sides. *L. scrobicollis* was first described by Say as *lateralis*, which name was preoccupied; then by Boheman under its present name, and later by LeConte as *læsicollis*.

509 (——). Lixus morulus sp. nov.

Elongate, slender, subcylindrical. Black, very sparsely clothed with evenly distributed short hairs and hair-like scales, the former occurring on the beak, thorax and under surface, the latter on the elytra; antennæ and tarsi reddish-brown. Beak rather slender, as long as thorax, compressed at middle, densely and finely reticulate-punctate, strongly carinate from insertion of antennæ to frontal fovea, the latter very small; antennæ inserted at apical fourth, second joint of funicle slightly longer than first, equal to the next two. Thorax as long as broad, sides subparallel on basal third, then gradually and evenly converging to apex; disc very finely and rather closely punctate, with scattered much coarser punctures intervening and with a deep impression on basal third. Elytra not wider at base than thorax and three and a half times as long, humeri absent, sides parallel to apical fifth, then feebly converging to the separately obtuse tips; disc with basal median fovea wide, shallow, lateral ones small, indistinct; rows of

punctures rather small, round, separated by nearly twice their diameters; intervals and entire under surface very minutely and sparsely punctate. Male with first and second ventral segments widely and deeply impressed at middle. Length 10 mm. (*W. S. B.*)

Kosciusko County, Ind., rare; May 29. The long and evenly cylindrical body, carinate beak and scale-like vestiture of elytra easily separate this from other members of the group.

GROUP II.

In this group the second joint of funicle is distinctly longer than the third and fourth combined.

KEY TO SPECIES OF GROUP II.

a. Color black throughout except the antennæ.
b. Elytra constricted at the sides just behind the basal angles.
c. First and second joints of funicle slender, subequal, each as long as the four following united, female, as the next three, male; beak very long, in female twice as long as thorax. 510. FIMBRIOLATUS.
cc. First joint of funicle stouter, half the length of second; beak but slightly longer than thorax. 511. DECEPTUS.
bb. Elytra not constricted at base.
d. Humeral angles prominent, the base of elytra wider than thorax. 512. JULICHI.
dd. Humeral angles obsolete, the elytra at base not wider than thorax.
e. Beak very sparsely punctate; scattered punctures of thorax coarse. 513. NITIDULUS.
ee. Beak densely punctate; scattered thoracic punctures fine.
f. Elytra distinctly mottled with small spots of pale pubescence; beak without smooth median line. 514. FOSSUS.
ff. Elytra not mottled with paler spots; beak with narrow smooth median line. 515. OBESULUS.
aa. Elytra reddish-brown, their tips subacute but not prolonged as in *L. rubellus;* thorax more or less impressed throughout its length, deeply so at base.
g. Thorax sparsely punctate; beak of female shorter than thorax; punctures of elytral rows rather fine and distant; length 8—11 mm. 516. TERMINALIS.
gg. Thorax densely punctate except near apex; beak of female longer than thorax; punctures of elytral rows coarse and rather close-set; length 7.5—8.5 mm. 517. SEXUALIS.

510 (8504). LIXUS FIMBRIOLATUS Boh., Schön., 1836, 42.

Very elongate, cylindrical, slender. Black, shining; above thinly cloth-ed with fine gray pubescence, which is condensed to form small, indistinct pale spots on alternate intervals of elytra and a narrow pale stripe along the sides, more distinct on thorax; under surface more densely pubescent. Beak very long, slender, curved, finely and sparsely punctate, and with an

elongate fovea between the insertion of antennæ. Thorax at base scarcely as wide as long, sides almost straight, gradually converging from base to much narrower apex; disc with sparse, rather coarse punctures, their intervals alutaceous and minutely roughly punctate; median impression large, deep, limited to the basal half. Elytra behind the basal constriction slightly wider than thorax; disc with rows of rather fine, not distant punctures, the median basal impression wider and much more shallow than that of thorax. Length 10—18.5 mm.

Lake, Starke, Vermillion and Hamilton counties, Ind., scarce; June 9—August 10. Definitely recorded from Illinois, Missouri, Kansas, Texas, Utah and Colorado. Easily known by its large size and elongate, slender first and second joints of funicle. Webster states (1892, 339) that it breeds in the stems of the saw-tooth sunflower, *Helianthus grosse-serratus* Mart., girdling the stem from within; also in those of the maple-leaved goose-foot, *Chenopodium hybridum* L., the larvæ boring down the axis of the stem. Both sexes usually exceed 14 mm. in length, but an occasional male is found which is much smaller. Usually known as *L. macer* Lec., but Champion has shown that *fimbriolatus*, previously described from Mexico, is the same.

511 (——) LIXUS DECEPTUS sp. nov.

Elongate, slender, cylindrical. Black, above very sparsely clothed with short gray hairs which are feebly condensed on sides of thorax and elytra; beneath more thickly pubescent, especially on prosternum and abdomen. Beak slender, cylindrical, almost glabrous, finely and sparsely punctate; head very finely alutaceous, punctate like beak, the frontal fovea faint, elongate. Antennæ slender, reddish-brown; second joint of funicle one-third longer than the next two combined. Thorax as wide at base as long, sides straight, feebly converging to near apex, which is but slightly constricted behind; disc roughly and unevenly sculptured, the larger punctures numerous, not coarse, their intervals alutaceous, minutely punctate; median impression wide, beginning near apex, much deeper at base, its surface wrinkled or roughly and coarsely punctate. Elytra as wide at base as thorax, their sides parallel to apical fourth, thence converging to the separately subacute tips, the sutural notch deep; disc with rows of round, rather coarse, somewhat distant punctures, the basal impression wide and rather shallow. Length 10 mm. (*W. S. B.*)

Starke County, Ind., rare; June 19. Resembles *fimbriolatus* in form, but easily distinguished by differences given in key. More slender and with much longer second funicular joint than *concavus*. The thorax, and especially the concavity of its median impression, is more roughly sculptured than in any other species herein described. In both this species and the preceding the usual basal median impression of each elytron is continued down

to the side margin, thus forming the "basal constriction of elytra" mentioned in key.

512 (10,854). LIXUS JULICHI Casey, 1891, 208.

Elongate, rather stout; subelliptical. Black, shining; sparsely clothed throughout with very short, scale-like hairs, which form small scattered spots on elytra and faint stripes on sides of thorax. Beak cylindrical, feebly curved, as long as thorax, both it and head rather finely, deeply and sparsely punctate. Thorax conical, but slightly wider than long; sides straight and strongly converging from base to apex; disc finely and strongly punctate with large deep punctures intermixed and with a deep rounded impression on basal third. Elytra distinctly wider at base than thorax, sides nearly straight and parallel in basal two-thirds, thence gradually narrowed to the subacute tips, the sutural notch narrow and deep; disc with rows of rather small, widely distant punctures. Length 11 mm.

Described from New Jersey, having been brought to Casey's attention by the late William Julich. Found on Arlington meadows in April and May; also near Washington, D. C. "A conspicuous species, recognizable by its prominent and tumid humeri, conical, deeply impressed thorax and gradually, very acutely ogival elytral apex." (*Casey.*)

513 (10,856). LIXUS NITIDULUS Casey, 1891, 210.

Elongate-oval, rather slender. Black, strongly shining; sparsely clothed with short, coarse hairs which, on the elytra, are condensed to form numerous distinct mottlings and on the sides of both thorax and elytra an indistinct pale stripe. Beak as long as thorax, sparsely, finely and deeply punctured, with a narrow, smooth median line, an elongate puncture between the insertion of the antennæ and another between the eyes. Thorax with sides feebly curved, converging from base to apex; disc with sparse, deep, and rather coarse punctures, intermixed with more numerous fine ones, the basal impression small but deep. Elytra with sides parallel and straight for three-fourths their length, thence converging to apex, which is broadly and feebly notched; disc with a broad shallow impression on basal third, the rows of punctures coarse, deep and rather distant. Length 9.3 mm.

Described from a single female from Indiana. Allied to *julichi* but more narrow and convex, the elytra subequal in width to thorax, and the basal impression of latter very small.

514 (8492). LIXUS FOSSUS Lec., 1876, 416.

Elongate, elliptical, robust. Black, above very densely clothed with minute gray scales and short white hairs, the latter usually forming a regular row or line of small mottlings along each row of elytral punctures; under surface thickly clothed with longer white hairs; antennæ reddish-brown. Beak of male stout, cylindrical, about as long as thorax, finely and densely punctured; of female, slightly longer, more cylindrical, less pubescent and more finely punctulate. Frontal fovea small, oval; antennæ stout, first joint of funicle thicker than and two-thirds as long as second,

the latter one-fourth longer than third and fourth united. Thorax at base slightly wider than long, sides subparallel on basal third, thence strongly converging to apex; disc with scattered small punctures, their intervals reticulate with very numerous much smaller ones; basal impression of male small, strongly sloping downward and very deep at base; of female, usually shallowly prolonged to middle. Elytra slightly wider behind the base than thorax, sides parallel to apical third, thence converging to a separately obtuse apex; discal punctures rather coarse and deep, widely distant, in part concealed by the small tufts of white hairs; basal impression broad, rather shallow. Length 8.5—10 mm.

Sarasota and Dunedin, Fla., rare; Feb. 2—March 27. Taken from beneath decaying stems of smartweed and beaten from a bunch of Spanish moss. Casey states that there is a large subdenuded spot on each elytron near the suture and just behind the middle, and a deep inter-antennal fovea on the beak. The Dunedin specimen has a trace of the spot on one elytron and the fovea very faint. The Sarasota specimen is of the variety described as *luculentus* by Casey. Hamilton has shown (1896, 185) that this is but a slender form of *fossus*, in which the mottlings of elytra are less distinct and the median impression of thorax less deep at base and more prolonged forwards. He states that it is common in Florida from Jacksonville southward. In typical specimens of *fossus* the peculiar placement of small mottlings along the rows of elytral punctures, and the minute, granular-like scales of vestiture are different from those of all other Lixi.

515 (10,857). Lixus obesulus Casey, 1891, 211.

Elliptical, robust, somewhat flattened above. Black, strongly shining, sparsely clothed with very short scale-like gray hairs, which on the elytra are condensed to form a few very small and widely scattered spots. Beak of male stout, feebly curved, slightly flattened, not quite as long as thorax, rather finely and densely punctate. Thorax conical, nearly one-fourth wider than long, sides evenly curved and strongly converging from base to apex; disc rather closely punctulate, with a few larger but not coarse punctures intermixed, the basal impression large, deep, irregular, not extending beyond the middle. Elytra scarcely more than twice as long as wide, at middle one-fourth wider than thorax; sides feebly curved and slightly divergent from base to beyond middle, then gradually converging to tips; strial punctures rather fine and distant. Length 10.2 mm.

The single male type was from Florida. "Belongs to the same group as *fossus*. Differs in its more robust form, shorter, sparser, much more squamiform and inconspicuous vestiture, in the impunctate line and obsolete inter-antennal fovea of beak, and in its larger size." (*Casey.*)

516 (8495). LIXUS TERMINALIS Lec., 1876, 157.

Elongate, rather slender. Above reddish-brown, shining, head and thorax usually darker, sparsely clothed with very short, scale-like gray hairs and small, widely scattered tufts of longer white ones; beneath fuscous black, thickly clothed with long, prostrate white hairs; antennæ and legs reddish-brown, femora fuscous. Beak stout, cylindrical, finely and rather densely punctate; front with a large, deep, elongate fovea. Thorax about as wide at base as long, sides converging from basal third to apex; disc, uneven on the sides, median impression beginning near apex, gradually widened behind, much deeper near base. Elytra with a large, deep sutural notch at apex, the tips separately subacute. Length 8—11.5 mm.

Common throughout Indiana; April 26—Oct. 24. Frequent on elm leaves in spring; mating thereon May 31. Snake Hill and Ramsey, N. J.; West Farms and Bronxville, N. Y., June and July. Ranges from New England to Iowa and Kansas, south to Florida. Bred from the stems of smartweed, *Polygonum pennsylvanicum* L., by Forbes.

517 (10,858). LIXUS SEXUALIS Casey, 1891, 212.

Elongate, slender, broader behind. Reddish-brown, very sparsely clothed with minute gray hairs; beneath darker, the hairs longer. Beak cylindrical, slightly broadened and flattened near tip, finely and sparsely punctate and with a more or less distinct but fine median carina. Thorax about as long as wide at base, sides feebly rounded, disc densely punctate with small and larger punctures intermixed, the median impression narrow in front, wider and gradually deeper behind. Elytra as wide at base as thorax; sides feebly diverging to apical third, thence strongly converging to the separately rounded tips; discal punctures very large, close-set, separated by narrow cross-ridges. Length 6.5—7.5 mm.

Sarasota, Fla., March 2. Frequent beneath dead stems of smartweed in bed of a recently dried up pond. Described from Austin, Texas. The Georgia specimen, mentioned by LeConte under his description of *L. terminalis*, is probably this species.

Tribe XVI. STERNECHINI.

This tribe is represented with us by a single genus, *Sternechus*, constituting "Group II Sternichides" of Lacordaire, and referred by him to Hylobiides, despite the subconnate tarsal claw, a character common to most of the Cleonini, near which it seems best placed, according to Champion (Biol., IV, Pt. 4, 1902, 113). Some of the species greatly resemble those of the Cryptorhynchid genus *Chalcodermus*. Our species are small, oval, very convex, having the beak shorter than thorax, thick, cylindrical; scape slender, enlarged at apex, reaching base of beak, first joint of funicle but slightly shorter than the next three united; elytra

subovate, acutely prominent at the sides behind the humeri; femora not clavate, armed beneath with a small erect tooth; tibiæ stout, obliquely truncate and mucronate at tip.

I. Sternechus Schön., 1826. (Gr., "breast" + "hairy.")

This genus, sufficiently characterized above, abounds in Tropical America, as far north as Mexico, Arizona, Florida and the Antilles. The species are often coated with reddish-ochreous or whitish waxy secretion as in *Lixus*, *Prionomerus*, etc. *Plectromodes* Casey (1895, 829) is a synonym. Two species are known from the United States, one of which occurs with us.

518 (——). Sternechus armatus Casey, 1895, 831.

Oval, strongly convex. Dark reddish-brown to black, shining; antennæ reddish-brown, the club darker; above very sparsely clothed with short, white, inconspicuous hairs; elytra with a few longer ones near apical declivity and along the intervals. Beak short, stout, three-fourths as long as thorax, rather coarsely, unevenly and sparsely punctate above. Thorax one-fourth wider than long, sides feebly curved, more convergent near apex; disc coarsely, deeply and very densely punctate. Elytra one-fourth wider and not twice as long as thorax, the posthumeral spiniform prominences strongly developed; disc behind the middle strongly sloping downward, marked with rows of coarse, deep rounded punctures, the intervals polished. Length 4—4.8 mm.

Described by Casey from two specimens from southern Illinois. Known also from Southern Pines, N. C., and Sumter Co., Fla. Recorded in Schwarz's Florida list as *Chalcodermus spinifer* Boh.

Tribe XVII. LÆMOSACCINI.

The large, prominent and widely separated front coxæ, exposed pygidium, lack of a prosternal channel for the beak in repose, feebly truncated humeri and straight ventral sutures are the principal characters of this tribe. Beak short, stout, cylindrical, its antennal grooves directed toward the lower angles of the eyes; antennæ inserted near the middle of beak, feebly elbowed, funicle 7-jointed, the joints gradually merging into the club; first and second ventral segments equal, each nearly as long as third and fourth united; legs stout, short; tibiæ strongly hooked at tip; tarsi dilated, the last joint very slender, its claws very small, simple. One genus represents the tribe.

I. Læmosaccus Schön., 1826. (Gr., "throat" + "bag.")

This genus, sufficiently characterized above, is represented in the United States by two species, one of which has been briefly described but not named by Townsend (1903, 96). The other is

519 (8711). Læmosaccus plagiatus Fab., 1801, II, 485.

Oblong, subcylindrical, robust. Black, opaque, glabrous; elytra with a large common red spot which sometimes covers the whole disc leaving only the narrow margins black. Beak much shorter than thorax, flattened above, opaque, striate and coarsely punctured, male; subcylindrical, shining, sparsely and finely punctured, female. Thorax bell-shaped, strongly convex, sides broadly rounded, much narrowed at apex; disc coarsely and very densely confluently punctate. Elytra narrower than thorax at middle, sides parallel, tips separately rounded; disc deeply striate, striæ feebly punctured; intervals strongly convex, each with a row of minute granules. Front and middle femora with an acute tooth. Length 3.2—4.5 mm.

Not yet known from Indiana, but should occur in the southern counties. Cincinnati, Ohio, (*Dury*). Throughout New Jersey, May—August; West Point, N. Y., (*Robinson*). Jacksonville, Gainesville, Sanford and Ocala, Fla., March 24—April 24; beaten from oak. Ranges from Massachusetts to southern Colorado, south to Florida and Texas. Occurs on oak, rarely on hickory. Bred in March from the galls of *Cynips cornigera* on the twigs of the swamp or pin-oak, *Quercus palustris* DuRoi. (*Davis.*)

Tribe XVIII. BARINI.

To this, one of the most important tribes of the Curculionidæ, belong a large number of small or medium sized species whose principal distinguishing character is the projecting upwards and outwards of the epimera of the mesosternum (Fig. 22, c) so that they form a sort of wedge or knob, often visible from above, each side of the body between the base of the thorax and elytra, thus obliquely truncating the humeri and giving the insects an appearance different from that of any other tribe of the subfamily. The Barini are usually compact, robust, elliptical, oval or subrhomboidal weevils of a black (rarely brown) hue, having the funicle always 7 jointed, the first and usually the second joint each longer than the third; club annulate; beak variable in form, not received closely upon the prosternum, its antennal grooves usually oblique and rapidly descending, sometimes wholly inferior; thorax without postocular lobes, not emarginate beneath and, in most cases, as wide or almost as wide as elytra; scutellum distinct; pectoral groove usually wanting; front coxæ always more or less separated; legs slender, femora in our genera unarmed (except in *Madarellus* and *Pseudobaris*), tibiæ with a short acute internal spur at apex; tarsi with third joint usually bilobed, the claws simple. The beak of the female is nearly always smoother, more slender, somewhat longer, less punctate and more strongly curved than in the male.

The larvæ live for the most part in the stems or roots of plants and are sometimes very injurious to cultivated forms. They usually pupate in the burrows which they have formed, constructing the cocoon of the remnants of the plant fibre. There remains much to be learned of the habits and food plants of these interesting insects, easy to separate as a tribe from other Rhynchophora, but exceedingly difficult to separate into species, unless food plant information can be accumulated and associated with each. Other than LeConte & Horn's Rhynchophora of America, the papers treating of North American species are by

LeConte, J. L.—"Analytical Table of the Species of Baridius inhabiting the United States," *in* Proc. Phil. Acad. Nat. Sci., 1868, 361—365.

Casey, Thos. L.—"Barini, in Coleopterological Notices, IV," *in* Ann. N. Y. Acad. Sci., VI, 1892, 460—684.

Casey recognized 39 genera, 30 of which are represented in our territory. Two others since proposed by Linell and Pierce also occur with us. For convenience of treatment they are primarily divided into two subtribes.

KEY TO SUBTBIBES OF BARINI.

a. Pygidium more or less completely exposed in both sexes and generally almost vertical. Subtribe I. Barides, p. 347.

aa. Pygidium oblique or horizontal, entirely concealed in the female, except in *Odontocorynus*, sometimes with the mere apex exposed in the male. Subtribe II. Centrini, p. 376.

Subtribe I. Barides.

In this subtribe the beak is usually shorter and stouter than in the next, and the elytra are more broadly and separately rounded at tips, this resulting in the exposed pygidium.

KEY TO EASTERN GENERA OF SUBTRIBE BARIDES.

a. Antennal club shorter, oval or conical, more or less pointed, never as long as the preceding six joints united; fifth ventral segment shorter than third and fourth combined, subtruncate; pygidium usually nearly vertical.

b. Tarsal claws free and more or less divergent.

c. Second joint of funicle short, not twice as long as wide.

d. Front coxæ not separated by a distance equalling their own width.

e. Antennal club small, nearly round, subglabrous and polished at base; form oval or oblong-oval, robust; beak never longer than thorax. I. Baris.

ee. Antennal club finely and densely pubescent throughout; form slender, elongate, subcylindrical.

f. Base of third elytral interval and sides of last three ventral segments with spots of white scales. II. PLESIOBARIS.

ff. Elytra and ventrals without spots. III. STENOBARIS.

dd. Front coxæ widely separated, prosternum broad and flat between them.

g. All the femora unarmed; upper surface distinctly sculptured.

h. Elytra roughly sculptured, thinly clothed with elongate yellowish scales; prosternum extending but slightly over the front edge of mesosternum. IV. GLYPTOBARIS.

hh. Elytra deeply, not roughly punctate, without yellowish scales; prosternum extending backward over front edge of mesosternum, truncate behind. V. ONYCHOBARIS.

gg. Front femora minutely toothed; upper surface smooth; elytra undulated. VI. MADARELLUS.

cc. Second joint of funicle elongate, more than twice as long as wide and fully as long as the next two combined. VII. AULOBARIS.

bb. Claws connate at base, nearly parallel or feebly turned outward toward apex.

i. Front coxæ widely separated; body above almost glabrous.

j. Thorax strongly constricted near tip; femora unarmed.

k. Elytra smooth, polished, undulated, feebly sculptured. VIII. AMPELOGLYPTER.

kk. Elytral striæ deeply crenato-punctate; intervals narrow, convex; color of our single species pale reddish-brown. IX. DESMOGLYPTUS.

jj. Thorax feebly constricted near tip; femora usually minutely toothed near apical third; prosternum deeply and narrowly sulcate. X. PSEUDOBARIS.

ii. Front coxæ narrowly separated; body densely clothed with pale hair-like scales; femora unarmed; prosternum not sulcate; length 3—4.5 mm. XI. TRICHOBARIS.

aa. Antennal club subcylindrical, densely pubescent, longer than the preceding six joints united; fifth ventral longer than third and fourth combined, rounded at tip; pygidium more oblique. XII. ORTHORIS.

I. BARIS Germar, 1824. (Gr., "boat.")

Medium sized black species having the form oval or oblong-oval, robust, convex; surface usually shining and almost glabrous; head minutely alutaceous, very finely and remotely punctate; beak stout, curved, not longer than thorax, separated from the head by a shallow impression; antennal club small, nearly round, its basal joint shining and making up more than one-half its mass; legs short, tibiæ strongly mucronate at tip and more or less strongly carinate and grooved along the sides; males nearly always with a distinct impression at middle of abdomen towards base. Other and more important characters are given in the generic key.

The species of Baris are usually taken in sweeping low moist meadows, the larvæ breeding in the roots, or the stems near the roots, of various plants. They channel the roots beneath the bark and pupate in their burrows. For example, *B. monardæ* Pierce has been bred in Texas from the roots of the lemon bergamot, *Monarda citriodora* Cerv., Pierce having found the larvæ in every root on June 26. On October 4 these had nearly all become adult, requiring five months for development from the egg and hibernating as adults in the roots. The genus, as at present limited, is a very large one, 48 North American species having been recognized by Casey, who has compared most of our specimens with his types. For convenience they are separated into three groups as follows:

KEY TO GROUPS OF EASTERN SPECIES OF BARIS.

a. Scutellum short, wider than long (except in *callida*), broadly and deeply impressed; front coxæ narrowly separated; tibiæ sinuate on outer side and prominent near apex; impression between head and beak feeble; body never with bronzed surface lustre.
GROUP A, p. 349.

aa. Scutellum small, subquadrate or rounded, not broadly impressed; front coxæ more widely separated; tibiæ straight; impression between head and beak usually strong, broadly angulate when viewed from the side; body often with bronzed surface lustre.

b. Thorax large, distinctly more than one-half as long as elytra, its median line, viewed from the side, strongly sloping toward apex; beak very short, one-half to three-fourths as long as thorax.
GROUP B, p. 352.

bb. Thorax short, not more than half the length of elytra, its median line feebly curved, not strongly sloping toward apex; beak variable but usually nearly as long or longer than thorax.
GROUP C, p. 355.

GROUP A.

Species of robust form, 3.2—5.8 mm. in length. The males have the first ventral segment and basal half of second broadly and deeply impressed.

KEY TO SPECIES OF GROUP A.

a. Scutellum wider than long and impressed.

b. Elytra at least twice as long as thorax.

c. Intervals of elytra strongly elevated and subequal in width.

d. Humeral callus prominent, the elytra being abruptly and distinctly wider than thorax, their sides parallel in basal two-thirds; abdomen with short, sparse setæ. 520. STRIATA.

dd. Humeral callus not prominent; body oval, the thorax strongly narrowed from base. 521. UMBILICATA.

cc. Intervals flat, feebly elevated, the third wider than the others; elytra not wider than thorax, the humeral callus very faint. 522. CARBONARIA.

bb. Elytra distinctly less than twice as long as thorax, their intervals narrow with single rows of punctures, except second and third, which are wider and with punctures confused. 523. STRENUA.

aa. Scutellum small, rounded, not transverse; punctures of thorax very coarse, nearly as large as scutellum; second and third intervals much wider than the others. 524. CALLIDA.

520 (8870). BARIS STRIATA Say, 1831, 17; ibid, I, 281.

Elongate-oval, convex. Black, shining, antennæ and tarsi piceous. Beak robust, strongly curved, a little shorter than thorax, coarsely and sparsely punctate on sides, more finely above. Thorax one-third wider than long, sides feebly converging from base to apical fourth, then strongly rounded and feebly constricted near apex; disc very coarsely and closely punctate. Elytra more than twice as long as thorax and nearly one-fourth wider at base; striæ wide, deep, punctate; intervals but little wider than striæ, each with a single row of coarse deep punctures. Length 4.8—6 mm.

Lake County, Ind., scarce; May 24—July 17. Highlands, N. C., June. Ranges from Michigan to Wisconsin and Montana, southwest to Arkansas and Arizona. Easily known by its large size, small thorax and narrow, coarsely punctured intervals. Collected by Pierce on ragweed and sneezeweed, *Ambrosia psilostachya* D. C. and *Helenium tenuifolium* Nutt., in Texas.

521 (8869). BARIS UMBILICATA Lec., 1868, 363.

Oval, strongly convex, robust. Black, shining, antennæ and tarsi dark reddish-brown. Beak feebly curved, three-fourths as long as thorax male, slightly shorter than thorax, female, rather coarsely and sparsely punctate, minutely alutaceous. Thorax subconical, sides strongly converging from base to near apex, then suddenly narrowed and constricted; disc coarsely, not densely punctured. Elytra at base slightly wider than thorax, sides nearly straight to beyond middle, then broadly curved to tips; striæ wide, deep, remotely punctate at bottom; intervals not wider, each with usually but a single row of rather coarse, deep, distant punctures. Beneath coarsely and densely punctate. Length 3.2—5.1 mm.

Southern half of Indiana, frequent, much less so in the northern counties; May 4—July 20; taken by sweeping low, moist meadows. Frequent throughout New Jersey in similar meadows. Occurs over the eastern United States south of Michigan and Wisconsin, as far west as Colorado and Texas. In two specimens at hand the punctures are confused on the basal half of the third and fifth intervals. The punctures of thorax are more widely separated than in any other member of this group, and their intervals are minutely alutaceous.

522 (——). Baris carbonaria sp. nov.

Elongate-oval, robust. Black, feebly shining; antennæ, tibiæ and tarsi piceous. Beak three-fourths as long as thorax, stout, curved, finely and rather sparsely punctate. Thorax feebly convex, one-third wider than long, sides straight and subparallel from base to apical third, then strongly rounded toward apex; disc finely and evenly punctate, the punctures separated by nearly their own diameters. Elytra oval, scarcely wider than and twice as long as thorax, sides almost parallel to apical third then broadly curved to the separately rounded tips; striæ rather narrow, deep; intervals each with a row of very fine punctures, those of the third and fifth much confused. Under surface densely and rather finely punctate. Prosternum rather deeply sulcate, the front coxæ separated by less than their own width. Length 5 mm. (*W. S. B.*)

Ottawa, Canada, June 13; collected by Bro. Germain. A large, somewhat flattened, intense black species, much more finely sculptured than any other of the group.

523 (8868). Baris strenua Lec., 1868, 363.

Oblong-oval, robust, strongly convex. Black, shining, deeply sculptured. Beak short, stout, curved, in female about two-thirds as long as thorax, rather coarsely and sparsely punctate. Thorax slightly wider than long, sides broadly rounded, suddenly narrowed and feebly constricted near apex; disc coarsely and rather densely punctate, and often with a short, median smooth line. Elytra about one-fifth wider and slightly less than twice as long as thorax; striæ wide, deep; intervals narrow, coarsely, deeply and closely punctate, each puncture bearing a very short, pale, recurved seta; second and third intervals wider, their punctures confused. Length 4.5—6.2 mm.

One specimen in Stein collection labelled "Indiana." Recorded from Illinois, Wisconsin, Montana, Kansas, Texas and Arizona. Known by its large size and confused punctures of second and third intervals.

524 (11,084). Baris callida Casey, 1892, 481.

Oblong-oval, strongly convex. Black, shining. Beak feebly curved, scarcely two-thirds as long as thorax, strongly punctate, its sides with coarse, elongate punctures. Thorax one-third wider than long, its punctures very large, deep and densely placed. Elytral striæ coarse, deep, finely punctate; intervals each with a row of coarse, close-set punctures, the second and third much wider than the others with the punctures broadly confused, the third nearly twice as wide as the striæ. Length 4 mm.

Taken in various localities in New Jersey, May 23—July. Staten Island, N. Y., Sept. 18. Known elsewhere only from Georgia. Resembles *B. umbilicata* but the punctures of thorax are denser and more uneven, and the punctuation of abdomen

fine and very sparse; it also differs in its decidedly shorter beak and smaller, more rounded scutellum. (*Casey.*) Larvæ, pupa and freshly emerged adults were found in the base of the stalk of a species of cocklebur (*Xanthium*) at Tottenville, Staten Island, in September. Pierce has described the work of an allied species in *Xanthium commune* Britt. in Texas. The larvæ feed in the stem and burrow down toward the root where they pupate; in the Staten Island case just below the level of the sandy soil in which the plant grew. Schwarz also reared a species of *Baris* from roots of *Xanthium*.

GROUP B.

To this group as above defined belong eight of our eastern species. The males have the first ventral segment feebly and broadly impressed at middle.

KEY TO SPECIES OF GROUP B.

a. Punctures of thorax sparsely, sometimes very remotely placed.
  b. Punctures of intervals of elytra fine.
    c. Legs black or piceous.
      d. Upper surface intense black, not polished; form oval, strongly convex; larger, 5.8—6 mm. 525. SUBOVALIS.
      dd. Upper surface highly polished and with a more or less pronounced bronzed lustre; length not over 4.5 mm.
        e. Disc of thorax with a wide but ill-defined elongate median smooth space; beak of female two-thirds as long as thorax. 526. LUBRICA.
        ee. Disc of thorax without smooth space; beak of female not more than one-half as long as thorax. 527. TUMESCENS.
    cc. Legs red, tarsi black; punctures of thorax large, very sparse, feebly impressed. 528. NITIDA.
  bb. Punctures of intervals coarse, rounded; prosternum distinctly impressed; elytral setæ semi-erect and conspicuous; beak of male one-half as long as thorax. 529. FLORIDENSIS.
aa. Punctures of thorax close-set and even, never separated by more than their own diameters; those of intervals generally large and more or less approximate.
  f. Upper surface uniform brown, feebly bronzed; beak strongly punctured; intervals coarsely and rugosely punctate; length 4.2—4.5 mm. 530. SUBÆNEA.
  ff. Upper surface black or piceous, never bronzed or brassy; beak finely punctured.
    g. Alternate intervals of elytra wider, their punctures confused; surface finely alutaceous; length 3.5—4.8 mm. 531. INTERSTITIALIS.
    gg. Intervals of equal width, each with a single row of coarse, close-set punctures, those on the third sometimes slightly confused; surface not alutaceous; length 3.2—3.6 mm. 532. DOLOSA.

525 (8871). Baris subovalis Lec., 1868, 363.

Evenly oval, strongly convex. Black, rather dull, finely alutaceous; antennæ and tarsi piceous. Beak of female stout, three-fourths as long as thorax, distinctly curved, finely, deeply, not densely punctured. Thorax large, one-third wider than long; sides straight and converging from base to apical fourth, then suddenly rounded and narrowed to tip; disc usually with a narrow, smooth median line, finely, deeply and sparsely punctured. Elytra not wider than middle of thorax; striæ deep, remotely punctate at bottom; intervals flat, one-half wider than striæ, each with one or more irregular rows of fine, deep punctures, those on the third and fifth confused. Length 5.8—6 mm.

Southern Pines, N. C., April 19. Described from Wisconsin.

526 (11,085). Baris lubrica Casey, 1892, 482.

Oblong-oval, strongly convex. Polished black, lustre quite distinctly bronzed; legs piceous. Beak of male stout, only half the length of thorax, feebly curved, finely, sparsely punctate. Thorax one-fourth wider than long; sides feebly converging to apical fourth, then strongly rounded and narrowed to apex; punctures of disc rather coarse, separated by nearly three times their own diameters. Elytra scarcely wider than thorax, sides feebly converging to apical third, then broadly rounded to apex; intervals at least twice as wide as striæ, flat, each with a row of small, rather distant punctures, those of the second, third and fifth more or less confused; setæ small but distinct, very silvery. Length 3.7—4.5 mm.

Ormond, Fla., April 7. Described from Florida, the types being in the National Museum collection.

527 (8875). Baris tumescens Lec., 1868, 362.

Oblong, convex. Polished black, feebly bronzed; antennæ and legs piceous-brown. Beak short, finely punctate. Thorax large, one-fourth wider than long, sides subparallel, strongly rounded and extremely convergent near apex; punctures rather fine, impressed, separated by twice their own diameters. Elytra but slightly longer than wide; two-thirds longer than thorax, deeply striate, the grooves crenulate; intervals flat, scarcely one-half wider than striæ, each with a single row of very small, deep, distant punctures, the third wider than the others, with confused punctures. Length 4—4.5 mm.

Ranges from New York to Michigan and Nebraska, south to Florida and Texas.

528 (8876). Baris nitida Lec., 1876, 292.

Oblong-oval, strongly convex. Polished black, feebly bronzed; legs red, tarsi piceous. Beak short, stout, curved, finely punctured. Thorax one-fourth wider than long, gradually narrowed from base for two-thirds the length, then suddenly narrowed to apex. Elytra scarcely wider than thorax, humeri prominent, sides rather strongly convergent behind them; striæ deep, not punctate; intervals about twice as wide as striæ, each with a single row of small, deep, distant punctures. Length 4—4.6 mm.

Biscayne Bay and many other localities in eastern Florida; not rare.

529 (11,087). BARIS FLORIDENSIS Casey, 1892, 485.

Oblong-oval, convex. Dark piceous-brown, shining; thorax blackish. Beak short, thick, sparsely punctate. Thorax one-fifth wider than long; sides subparallel from base to middle, then broadly rounded to apex, the punctures rather coarse, deep, separated by their own diameters. Elytra one-third longer than wide, slightly wider at humeri than thorax; striæ deep, finely and distantly punctate; intervals less than twice as wide as striæ, the second wider, its punctures confused. Length 4 mm.

Originally described from a single Florida male. "Differs from *transversa* (*interstitialis*) by its much sparser punctuation, narrower form, piceous elytra and longer elytral setæ. (*Casey.*)

530. (8874). BARIS SUBÆNEA Lec., 1868, 361.

Oblong-oval, convex. Uniform dark brown, feebly bronzed, finely alutaceous. Beak stout, curved, one-half as long as thorax, male, finely carinate, rather closely and distinctly punctate. Thorax strongly convex, about as wide as long, sides straight and converging from base to apical fourth, then strongly rounded and narrowed to apex; disc coarsely, deeply and rather densely punctate, with faint median smooth line. Elytra scarcely wider at base than thorax, striæ deep, finely punctate; intervals wide, their punctures very coarse, those of the first, third and fifth somewhat confused. Prosternum coarsely punctured, broadly subsulcate. Length 4.2—4.5 mm.

Throughout New Jersey, not rare; May—July. Recorded from "Middle States" and District of Columbia. Known also from Arkansas. The above description is based on the type specimen in the Cambridge collection. LeConte's description is very short and misleading, the color being not black but uniform dark brown, and the intervals only in part with confused punctures; in fact, in specimens otherwise inseparable they are in one regular row on each interval.

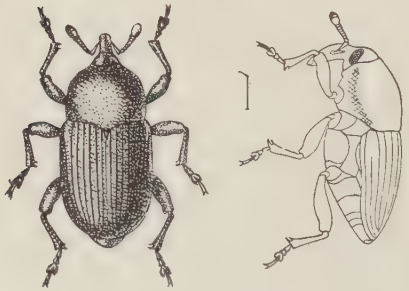


Fig. 91. *Baris interstitialis* Say. Dorsal and side views. × 6.

531 (8877). BARIS INTERSTITIALIS Say, 1823, 314; ibid. II, 176.

Oblong, robust, convex. Black, alutaceous, antennæ and legs dark reddish-brown. Beak stout, strongly curved, one-half as long as thorax, very finely and rather sparsely punctate. Thorax subquadrate, slightly wider than long, the sides feebly converging to apical fourth, then suddenly

rounded to tip; disc strongly convex, coarsely, very densely punctate, with often a narrow, smooth median line. Elytra equal in width to thorax, striæ coarse, deep; intervals alternately wider, with coarse, close punctures, confused on the wider intervals. Length 3.5—4.8 mm. (Fig. 91.)

Frequent throughout Indiana; June 7—July 6. Taken from the flowers of Jersey tea, *Ceanothus americanus* L., and other plants, usually in the vicinity of ponds. Anglesea, N. J., and West Point, N. Y.; May 30. Ranges from New England to Colorado, south to Florida and Texas. Varies greatly in size and sculpture.

Casey united the two species *transversa* and *interstitialis* of Say under the former name, whereas, if they are the same, *interstitialis* has priority by seven years. Moreover, Say (1831, 18), distinctly states that the punctures of *interstitialis* have a "transverse rugulose appearance," and again in comparing the two species says that "in the form of the thorax *transversa* resembles *interstitialis*, but the punctures (of thorax) are much larger, the posterior lobe more rounded, and the punctures of the intervals are rounded." His original description of *interstitialis*, taken in connection with his subsequent statements above quoted, leave no doubt but that the species called *transversa* by Casey is Say's *interstitialis* as above described by us. What Say's *transversa* is we do not know unless it be Casey's *callida*. The type of *carinulata* Lec., shows it to be, as pointed out by Casey, only a form of *interstitialis* with median smooth line of thorax more distinct and punctures of intervals less confused.

532 (11,093). BARIS DOLOSA Casey, 1892, 490.

Oblong-oval, strongly convex. Piceous-black, shining, the elytra often piceous. Beak two-thirds, male, three-fourths, female, as long as thorax, thick, coarsely and closely punctured on sides. Thorax two-fifths wider than long, coarsely, closely and deeply punctate, the punctures separated by one-half to two-thirds their own diameters. Elytra slightly wider at humeri than thorax, sides subparallel, apex broadly rounded, striæ deep, punctate at bottom. Length 3.2—3.6 mm.

Kosciusko Co., Ind., scarce; June 3—25. Described from Indiana, Long Island, N. Y., Pennsylvania and Iowa. "A strongly and deeply sculptured species, resembling *transversa* but much smaller." (*Casey.*)

GROUP C.

To this group, as defined in the key, belong 17 of our eastern species of the genus. They are all less than 4.2 mm. in length, for the most part strongly shining, and the males have the abdomen but slightly if at all modified.

KEY TO EASTERN SPECIES OF GROUP C.

a. Upper surface rather thickly clothed with pale brown and white scales. 533. SCOLOPACEA.

aa. Upper surface without scales.

b. Abdomen very densely and rugosely punctured throughout its width; punctures of thorax coarse and sparse; length 2.8—3.2 mm. 534. PUNCTIVENTRIS.

bb. Abdomen less densely and rugosely punctate, at least toward the middle.

c. Punctures of elytral intervals larger, their diameters always more than one-third the width of the narrower intervals.

d. Legs red; color piceous, strongly alutaceous. 535. CANADENSIS.

dd. Legs black or piceous; color black.

e. Thorax with sides broadly sinuate in basal two-thirds, its disc densely punctured without trace of median line. 536. DEFORMIS.

ee. Sides of thorax not sinuate, disc usually with a narrow, smooth median line.

f. Thorax longer, one-fourth wider than long, more depressed, distinctly converging from base to apex. 537. SOCIALIS.

ff. Thorax short, broad, three-fifths wider than long, feebly converging from base to apex.

g. Elytral intervals each with a single row of fine, remote punctures; smaller, 2.8—3.4 mm. 538. CONFINIS.

gg. Punctures of intervals somewhat coarser, more close-set, those of the third confused; larger, 3.4—4 mm. 539. SUBSIMILIS.

cc. Punctures of intervals small, their diameters never more than one-third the width of the intervals; very shining, usually bronzed or brassy species.

h. Thorax densely punctate, the punctures separated by only one-half their own diameters; length 3—3.5 mm.

i. Body narrowly oval; sides of thorax converging from the base and broadly and evenly curved. 540. APERTA.

ii. Body broadly oblong; thorax much wider, its sides abruptly rounded and converging in front. 541. ABRUPTA.

hh. Thorax more sparsely punctate, the punctures separated by one to three times their own diameters.

j. Form narrow, the thorax but slightly wider than long; surface with strong brassy lustre; length 2.5 mm. 542. DISCIPULA.

jj. Form more broadly ovate, thorax distinctly wider than long.

k. Surface with bronzed or brassy lustre.

l. Beak very short, scarcely two-thirds as long as thorax; length 2.3—2.9 mm. 543. ÆREA.

ll. Beak as long or nearly as long as thorax.

m. Smaller, less than 2.5 mm.; elytral striæ very fine; base of thorax less than three times as wide as head. 544. SCINTILLANS.

mm. Larger, 3.5 or more mm.; striæ coarse; base of thorax three times as wide as head, or nearly so.

n. Thorax short, transverse, its sides subparallel and broadly curved; punctures of third interval not confused. 545. ÆNEOMICANS.

nn. Thorax longer, its sides nearly straight and converging from base. (Florida species.)

o. Elytra black, bronzed; punctures of thorax separated by their own diameters. 546. HYPERION.

oo. Elytra dark reddish-brown, bronzed; punctures much coarser, separated by twice their own diameters. 547. VITREOLA.

kk. Surface highly polished but not bronzed or brassy. (Florida species.)

p. Legs black; body elongate-oval, black with feeble bluish lustre; length 3.3 mm. 548. ANCILLA.

pp. Legs dark reddish-brown; elytral intervals very finely punctate; length 3.3—4.1 mm. 549. SPLENDENS.

533 (11,116.) BARIS SCOLOPACEA Germ., 1824, 202.

Elongate-oval, convex. Dark brown to black, above densely but unevenly clothed with pale brown and white scales, the latter forming a spot near base and apex each side of thorax and numerous small spots on elytra, the most conspicuous one near the suture behind the middle of each elytron; antennæ and tarsi reddish-brown. Beak slender, cylindrical, strongly curved, as long as thorax, almost glabrous, densely punctate. Thorax scarcely wider at base than long, narrowed in front, sides feebly rounded, disc rather coarsely, deeply and densely punctate. Elytra at base scarcely wider than thorax; striæ deep, intervals flat, punctate. Length 3.5 mm.

Staten Island, N. Y.; July. Watch Hill, R. I.; July 13. An introduced European species; common locally throughout New Jersey, May to August on ragweed. Known also from Long Island, N. Y., and near Philadelphia, Pa. More elongate and slender than our native species, resembling *Cylindrocopturus* in general appearance.

534 (11,097.) BARIS PUNCTIVENTRIS Casey, 1892, 493.

Oblong-oval, moderately convex. Black, shining, legs piceous, antennæ and tarsi paler. Beak rather stout, strongly curved, nearly as long as thorax, rather coarsely, not densely punctate. Thorax nearly one-half wider than long; disc without median smooth line, coarsely, deeply punctate, the punctures becoming minute toward apex. Striæ of elytra deep, narrowing from base to apex, feebly punctate; intervals wide, flat, each with a single row of small punctures. Length 2.8—3.2 mm.

Described from Indiana without definite locality; also from Missouri and Louisiana.

535 (——). BARIS CANADENSIS sp. nov.

Elongate-oval. Piceous, thorax darker; legs red, tarsi piceous. Beak stout, curved, three-fourths as long as thorax, finely and rather densely punctate. Thorax one-fourth wider than long, sides almost straight, con-

verging from base to apex, disc rather finely, evenly and densely punctate. Elytra scarcely wider at base and nearly twice as long as thorax, sides parallel to apical third, then broadly rounded to apex; striæ fine, indistinctly punctate; intervals each with a single row of rather large, shallow punctures. Under surface, except middle of abdomen, coarsely and densely punctate. Front coxæ narrowly separated. Length 3 mm. (*W. S. B.*)

Ottawa, Canada, rare; June 13; collected by Bro. Germain. Our only eastern species of the group with red legs.

536 (11,100). BARIS DEFORMIS Casey, 1892, 496.

Oblong-oval, somewhat depressed. Black, shining; elytra rarely feebly bronzed. Beak stout, three-fourths the length of thorax, strongly curved, finely, not densely punctate. Thorax short, strongly transverse, one-half wider than long; disc rather finely, very deeply and extremely densely punctate. Elytra very slightly wider and more than twice as long as thorax; sides straight, feebly but distinctly converging behind the humeri; striæ fine, deep; intervals flat, nearly twice as wide as striæ, each with a row of small punctures, the second and third wider, their punctures confused. Length 3—3.7 mm.

Lake and Dubois counties, Ind.; May 9—May 29. Edgebrook, Ill., July 20—Aug. 2. Known also from Iowa, Nebraska, Missouri and North Carolina. The short, very broad, densely punctate thorax with sides sinuate make its identification easy.

537 (11,104). BARIS SOCIALIS Casey, 1892, 499.

Oblong-oval, rather slender. Black, shining, tibiæ and tarsi piceous. Beak stout, feebly, evenly curved, three-fourths as long as thorax, finely and rather densely punctate. Thorax two-fifths wider than long, sides slightly but distinctly converging from base to apical fourth, then rounded and narrowing to apex; disc rather finely, unevenly, not densely punctate. Elytra twice as long as thorax, and at humeri distinctly wider, sides thence feebly converging to the broadly rounded apex; striæ deep, finely punctate at bottom; intervals minutely alutaceous, each with a row of small, somewhat distant punctures, the second and third wider, the punctures of third confused. Length 3.5—3.7 mm.

Lake and Starke counties, Ind., rare; May 29. Described from Missouri and Texas. Known also from Iowa.

538 (8878). BARIS CONFINIS Lec., 1868, 362.

Oblong-oval. Blackish-bronzed, shining. Beak very stout, finely and sparsely punctate. Thorax scarcely wider than long; sides feebly converging to apical fourth, then obliquely narrowed to tip; disc coarsely, deeply and rather sparsely punctate, the punctures separated by their own diameters. Elytra oblong, their sides parallel for three-fourths their length; striæ rather wide, deep, punctate; intervals flat, each with a single row of rather fine distant punctures. Length 2.8—3.4 mm.

Frequent throughout Indiana; April 12—May 25; beneath bark of beech on former date. Ocean Co., N. J., May 28. Ranges from New England to Iowa and Kansas, south to Florida and Texas. Bred from the stems of black beggar-ticks, *Bidens frondosa* L., by C. M. Weed; collected on a closely allied plant, *Corcopsis cardaminefolia* D. C. by Pierce. The intervals are minutely alutaceous, and the thorax in the type has only a trace of a narrow, median smooth line.

539 (11,103). BARIS SUBSIMILIS Casey, 1892, 499.

Oval, rather robust, moderately convex. Black, highly polished and with a bronzed metallic lustre. Beak about three-fourths as long as thorax, strongly, not densely punctate. Thorax two-fifths wider than long; disc as in *confinis*, the median smooth line very narrow. Elytra slightly wider and twice as long as thorax, striæ rather coarse, feebly punctate; intervals flat, nearly twice as wide as striæ, each with a row of deep, rather close-set punctures, those of the third and base of fifth intervals confused. Length 3.4—4 mm.

Starke Co., Ind., rare; May 9. Described from Pennsylvania, Indiana and Missouri. In the Leng and Angell collections from Greeley, Colorado. "Resembles a large *confinis*, but has the punctures of intervals more close-set and the abdomen more densely and rugosely punctured." *(Casey.)*

540 (11,105). BARIS APERTA Casey, 1892, 500.

Narrowly oblong-oval. Thorax black; beak, antennæ, elytra and legs piceous, alutaceous, feebly bronzed. Beak strongly curved, three-fourths as long as thorax, rather finely, not densely punctured. Antennal club large, globular. Thorax one-third wider than long, disc very densely, deeply and rather coarsely punctate, without median smooth line, the punctures confluent on the sides. Elytra twice as long as thorax, scarcely wider at base, sides parallel to apical third; striæ coarse, deep, finer toward apex; intervals each with a single row of small, remote punctures. Length 3—3.5 mm.

Lake Co., Ind.; May 21. Described from Dakota.

541 (11,106). BARIS ABRUPTA Casey, 1892, 501.

Oblong-oval, convex. Black, highly polished with a pronounced brassy lustre. Thorax short and broad, three-fourths wider than long. Elytra large, slightly wider and twice as long as thorax; striæ deep, not coarse; intervals flat, twice as wide as striæ, their punctures very fine, close-set, those on the second and third confused. Length 3.4 mm.

Described from Pennsylvania. The unique type is a male having a large, rather strong impression toward the base of the abdomen.

542 (11,108). BARIS DISCIPULA Casey, 1892, 503.

Oblong, slender, rather convex. Black, highly polished, legs piceous. Thorax scarcely one-third wider than long; disc coarsely and deeply punctate, the punctures separated by less than their own diameters. Elytra as in *ærea*. Length 2.5 mm.

Described from Indiana. Recorded elsewhere only from District of Columbia. Very close to *ærea*. Casey says it "differs in its narrower, more parallel form, longer, rather more coarsely and densely punctured thorax and longer beak."

543 (8879). BARIS ÆREA Boh., Schön., 1844, 141.

Oblong-ovate, convex. Black, bronzed, strongly shining; legs and antennæ dark reddish-brown. Beak stout, two-thirds as long as thorax, feebly curved, rather coarsely and sparsely punctate. Thorax short, one-third wider than long, sides nearly straight, parallel from base to apical fifth, then strongly rounded to near apex; disc without median smooth line, coarsely, deeply and sparsely punctate, the punctures separated by two to three times their own diameters. Elytra but slightly wider and not twice as long as thorax; striæ fine, deep, faintly punctate; intervals wide, flat, each with a single row of very minute distant punctures. Length 2.3—2.8 mm.

Marshall, Dubois, Clark and Posey counties, Ind., scarce; April 21—June 12. Cramer Hill, Manumuskin and Atlantic City, N. J., Apr. 23—June. Ranges from New Jersey and Ohio to Florida and Texas. Collected on aster at Jacksonville, Texas, by Pierce.

544 (11,109). BARIS SCINTILLANS Casey, 1892, 504.

Oval, moderately convex. Black, very smooth, highly polished, strongly bronzed. Beak stout, evenly curved, finely and very sparsely punctate. Thorax two-fifths wider than long, sides feebly curved to apical third, then strongly converging and distinctly sinuate to apex; punctures of disc distinctly finer than in *ærea*, separated as there, obsolete near apex. Elytra slightly more than twice as long as thorax, and at basal third distinctly wider than the latter; intervals three times as wide as striæ, very minutely and remotely punctate. Length 2.2 mm.

Eustis, Sanford and Sanibel Island, Fla., rare; March 11—April 9. Casey's type was from "southern Florida." Our smallest species of the genus. The most evident characters separating it from *ærea* are the longer beak, more narrowed and almost impunctate apical fifth of thorax, its smaller discal punctures and the still smaller, almost invisible punctures of elytral intervals.

545 (11,110). BARIS ÆNEOMICANS Casey, 1892, 505.

Oblong-oval, somewhat depressed. Color of *ærea*. Beak stout, strongly curved, very nearly as long as thorax, finely, deeply and sparsely punctate. Thorax one-half wider than long; disc with narrow but distinct

smooth median line, its punctures coarse, deep, separated by nearly their own diameters. Elytra more than twice as long and at humeri slightly wider than thorax; striæ narrow, deep, finely and remotely punctate; intervals flat, twice as wide as striæ, each with a single row of small, distinct, widely distant punctures. Length 3.5 mm.

Sanford and Dunedin, Fla.; Feb. 11—Apr. 4. Known heretofore only from the unique type taken in Massachusetts.

546 (11,111). BARIS HYPERION Casey, 1892, 505.

Oblong-oval, convex. Black, highly polished, strongly bronzed. Beak stout, curved, four-fifths as long as thorax, flattened near apex; finely and sparsely punctate. Thorax nearly one-half wider than long, sides straight and feebly converging on basal two-thirds, then strongly rounded but not constricted at apex; disc without smooth median line, its punctures rather coarse, separated by about their own diameters. Elytra as wide and twice as long as thorax; sides straight, very feebly converging to apical fourth, then rounding to tips; striæ fine, deep, not punctate; intervals twice as wide as striæ, each with a row of small, shallow, distant punctures, the second and especially the third much wider, the latter with punctures somewhat confused. Length 3.5—4 mm.

Kissimmee and Dunedin, Fla., scarce beneath boards along borders of ponds; Jan. 16—Nov. 9. Described from Florida without definite locality. Distinguished from *uncomicans* by "its more elongate, more finely punctate thorax, with the sides much less rounded, and by its relatively shorter beak. (*Casey.*)

547 (11,112). BARIS VITREOLA Casey, 1892, 506.

The unique type is a male not closely allied to any other species; black with a strong bronzed lustre, elytra rufo-piceous. Beak almost as long as thorax. Punctures of thorax coarser and separated by about twice their own diameters. Elytral intervals with a single row of fine remote punctures, the third interval scarcely wider than the others. Length 3.4 mm.

Described from Florida.

548 (11,113). BARIS ANCILLA Casey, 1892, 507.

Oval, rather slender, convex. Black with a feeble bluish lustre, strongly shining; elytra minutely alutaceous. Beak very stout, curved, finely and rather sparsely punctate. Thorax one-third wider than long, sides feebly curved from base to apical third, then evenly rounded and converging; punctures of disc rather coarse, separated by slightly more than their own diameters. Second and third elytral intervals wider than the others, all with a single row of fine, remote punctures. Length 3.3 mm.

Dunedin, Fla., scarce; Feb. 17; also collected by Morrison in Florida, without definite locality. Aside from its lack of bronzed lustre it differs from "*confinis* by its sparser punctuation and

from *ærea* by its more elongate form, larger size, wider intervals and finer striæ." (*Casey.*)

549 (11,114). BARIS SPLENDENS Casey, 1892, 507.

Oblong-oval, robust, moderately convex. Black, highly polished without bronzed lustre, finely alutaceous. Beak very stout, moderately curved, two-thirds to three-fourths as long as thorax, finely and rather closely punctate. Thorax two-fifths wider than long; sides feebly converging from base for two-thirds the length, then strongly rounded to apex; disc very finely, sparsely and unevenly punctured. Elytra slightly wider and not quite twice as long as thorax; striæ coarse, deep, obsoletely punctate; intervals with a single row of minute remote punctures, the second and third wider, the latter with punctures confused. Length 3.8—4.2 mm.

Ormond, Sarasota and Dunedin, Fla., Feb. 14—April 8. Frequent on the flowers and in the axils of the leaves of the large yellow or purple flowered thistle, *Carduus spinosissimus* Walt. Fernandina and Crescent City, Fla.; not rare on a white flowering thistle. (*Schwarz.*) This is the species described by LeConte (1876, 293) under the name of *interstitialis* Say, but as already shown, that name belongs rightfully to what LeConte and Casey called *transversa*. Easily known by its large size and fine punctures of thorax and intervals.

II. PLESIOBARIS Casey, 1892. (Gr., "near" + Baris.)

Small, subcylindrical species, usually less than 2.5 mm. in length, having the entire antennal club finely and densely pubescent; prosternum not sulcate; upper surface with scattered white scales, especially dense on the sides of the last three ventral segments, on the meso- and metasternal side pieces and at the base of the third elytral interval; claws small, free. Those not described by Casey were included by LeConte in the genus *Pseudobaris*.

KEY TO SPECIES OF PLESIOBARIS.

a. Elytra each with a patch of sparsely placed pale scales behind the middle; body subcylindrical, the elytral humeri not exposed; basal joint of antennal club large, comprising at least one-half the mass.

b. Larger, 2.2—3 mm. in length; reddish-brown, the elytral suture blackish. 550. ALBILATA.

bb. Smaller, not over 1.8 mm.

c. Black, legs dark reddish-brown; beak shorter than thorax. 551. T-SIGNUM.

cc. Piceous-black; legs red with knees black. 551-a. var. SIGNATIPES.

aa. Upper surface and legs wholly black; thorax and elytra not continuous at the sides, the humeri more or less exposed; basal joint of club short, composing one-third of the mass or less.

d. Pale scales of elytra clustered in several small spots on the third and fifth intervals and also scattered over the sides; those of thorax arranged in a more or less distinct pattern. 552. ÆMULA.

dd. Pale scales condensed only at base of third interval of elytra; thorax without pattern of scales. 553. DISJUNCTA.

550 (8892). PLESIOBARIS ALBILATA Lec., 1876, 298.

Elongate, subcylindrical. Reddish-brown, shining, the beak, under surface, knees, suture and sometimes the thorax piceous-black; very sparsely clothed with minute whitish scales, condensed at base of third interval, on sides of last three ventral segments and side pieces of meso- and metasterna. Beak stout, as long as thorax, curved, cylindrical, finely and closely punctate. Thorax slightly longer than wide, sides rounded on apical third; disc coarsely and densely punctate. Elytra not wider at base than thorax, their sides straight to apical third, then rapidly converging to the obtuse apex; striæ narrow, deep, not punctured; intervals flat, twice as wide as striæ, each with a row of minute, rather distant punctures. Under surface coarsely and densely punctate. Length 2.2—3.1 mm.

Lake County, Ind., rare; May 30. Buena Vista, N. J., on yellow daisies; possibly a misidentification. Enterprise, Lake Ashley and Tampa, Fla.; common on swampy meadows. (*Schwarz.*) Not recorded elsewhere. One of the two Indiana specimens has a distinct smooth median line; in the other it is wholly wanting. Both have the elytra reddish-brown, the thorax almost as dark as the under surface and a small patch of white scales on each elytron at the upper edge of the declivity.

551 (8893). PLESIOBARIS T-SIGNUM Boh., Schn., 1844, 154.

Oblong, subcylindrical, convex. Black, feebly shining; thorax with scattered pale scales on the sides; elytra with similar scattered scales, a small white spot behind the middle and an elongate spot at base of third interval. Beak stout, strongly curved, shorter than thorax, flattened at tip, finely punctate. Thorax subquadrate, scarcely longer than wide, sides almost straight, feebly constricted near apex; base profoundly bisinuate, disc densely and rather coarsely punctate. Elytra scarcely twice as long and at base not wider than thorax; striæ deep, obsoletely punctate; intervals flat, each with a row of fine but distinct punctures. Length 1.8 mm.

Recorded from New Jersey, Pennsylvania, Michigan and District of Columbia. The above, with the exception of the length, is a condensed and free translation of the original description of Boheman. Without his type at hand for comparison, the Coleopterists of this country have widely disagreed as to just what insect it refers, and those for which the records above are given may have been wrongly determined.

551a (11,118). PLESIOBARIS T-SIGNUM SIGNATIPES, Casey, 1892, 510.

Subcylindrical, convex. Piceous-black, legs slightly paler, more rufous, with the knees black, clothed with minute white scales arranged as in *T-signum* from which it "differs in its piceous color, apparently sparser pronotal punctures and in the form of the base of thorax, which is less strongly bisinuate than is that of *T-signum*, as set forth in the description of the latter. Length 1.8 mm." (*Casey.*)

Described from Tampa, Florida. From Casey's description we infer that this is but a small color variety of *T-signum* and have so placed it. A comparison of all types will be necessary to show the correct status of our species of this genus.

552 (11,119). PLESIOBARIS ÆMULA Casey, 1892, 512.

Subcylindrical, strongly convex. Deep black throughout, shining; thorax with short, broad white scales arranged in a lateral stripe prolonged along the basal margin almost to middle, then bent diagonally forward. Elytra with similar scales forming four small spots on third interval, and sometimes three spots on fifth interval. Beak stout, about as long as thorax, strongly curved, finely punctate. Thorax one-third wider than long, sides parallel and straight on basal three-fourths, then subangulate and converging to apex; disc without median line, rather finely and densely punctate. Elytra slightly wider and more than twice as long as thorax, striæ fine, deep; intervals flat, third and fifth much the wider, each with a row of small, rather distant punctures. Length 1.6—1.7 mm.

Schwarz found this species common in Florida on swampy meadows in company with *albilata*. Listed by him under the name *T-signum*. The short basal joint of the antennal club easily separates this and the next from the preceding species.

553 (11,120). PLESIOBARIS DISJUNCTA Casey, 1892, 513.

Subcylindrical, very slender. Black throughout, sparsely clothed with very small white setæ, scarcely denser at sides of thorax, scale-like, and forming a small elongate spot at base of third interval and very dense beneath on sternal side pieces and sides of last three ventral segments. Beak slightly longer than thorax, otherwise as in *æmula*. Thorax one-fourth wider than long, sides feebly diverging and nearly straight from base almost to apex; disc rather coarsely, deeply and very densely punctate, with a narrow, ill-defined smooth line on middle third. Elytra at base abruptly and distinctly wider than thorax; striæ fine, coarser near base; intervals two to three times wider than striæ, each with a row of fine punctures. Length 1.7—2.1 mm.

Casey's types were from Indiana without definite locality; also from Michigan, Missouri and South Carolina. Known elsewhere from Massachusetts, Ohio and District of Columbia. Occurs in swampy meadows. LeConte considered this as Boheman's

t-signum, but the original description of the latter, as above given, states that the beak is shorter than thorax, elytra not wider than base of thorax, with a pale spot behind the middle, and legs rufo-piceous, all characters widely at variance with the present species.

III. Stenobaris Linell, 1897. (Gr., "narrow" + Baris.)

Body slender, sparsely clothed with linear scales, not condensed into spots; beak not separated from the head, slender, cylindrical, curved, as long as thorax; antennæ inserted before its middle, club oval, densely pubescent, as long as the preceding four joints combined, second funicular joint as long as the next two united; front coxæ large, very narrowly separated; prosternum slightly convex, transversely impressed at the apical margin; tarsal claws very small, free; pygidium completely exposed, oblique. "Allied to *Plesiobaris* Casey, from which it differs by the slender form, narrow prosternum, longer second funicular joint and the vestiture not forming any spots." (*Linell.*)

554 (——). Stenobaris avicenniæ Linell, 1897, 52.

Elongate, lanceolate. Bronzed, shining; beak, antennæ and legs reddish-brown. Beak nearly smooth, finely punctate on the sides at base. Antennæ slender, scape not reaching the eye; club piceous, the basal joint large, composing one-half the mass. Head bronzed, alutaceous, coarsely but not densely punctate, rugose and scaly between the eyes. Thorax cylindrical, as long as wide, narrowed but not constricted at apex; disc very coarsely and densely punctate, each puncture bearing a narrow yellowish-white scale at the bottom. Elytra at base distinctly broader than thorax, humeri prominent; sides parallel for four-fifths the length, then curved to apex; striæ fine, coarser at base, subobsoletely punctate; intervals flat, remotely transversely strigose, each striga with a small puncture, bearing a long, narrow grayish-white scale. Ventral surface with scale-bearing punctures, rather dense on the thoracic segments, sparse on the abdomen. Length 3 mm.

Punta Gorda, Fla., July 14; on the black mangrove, *Avicennia nitida*.

IV. Glyptobaris Casey, 1892. (Gr., "engraved" + Baris.)

In *Baris* the front coxæ are very narrowly separated in *umbilicata*, *strenua* and *callida*, more widely in the other species, but never by a distance equalling their own width; in *Glyptobaris* they are remote, the prosternum broad and flat between them and having two small, deep foveæ widely distant in front and connected by a very narrow, deep, abrupt groove. From each fovea

there extends a fine, deep, curved groove, the two converging and enclosing a flat, triangular impunctate space. This genus resembles the next two in the remote front coxæ.

555 (8900). GLYPTOBARIS RUGICOLLIS Lec., 1876, 297.

Oblong-oval, convex. Dark reddish-brown, shining; above thinly clothed with large elongate yellowish scales, arranged on the elytra in a cross-band at base and another behind middle, the two connected by a stripe of scales each side of suture. Beak rather slender, longer than thorax, strongly curved, tapering toward tip, coarsely punctured on sides, more finely above. Thorax one-fourth wider than long, sides broadly rounded in front, subparallel near base; disc deeply and coarsely rugose and usually with a narrow, elevated median smooth line. Elytra slightly wider at base than thorax, distinctly narrowed from base to apex; striæ deep, remotely crenulate; intervals flat, each with a row of rather large, distant punctures. Length 3.6—4.3 mm.

Southern half of Indiana, frequent; not taken north of Marion Co.; May 12—Sept. 19. Dunellen and Atco, N. J., on milkweed. Occurs in marshy meadows. Ranges from New Jersey and Pennsylvania to Illinois, south to South Carolina. Champion apparently without valid reason, has changed the name *rugicollis* to *lecontei*.

V. ONYCHOBARIS Lec., 1876. (Gr., "claw" + Baris.)

Oval, robust, usually densely punctured species having the second joint of funicle not longer than third, club oval; beak longer and more slender than in *Baris*, strongly curved; prosternum long, nearly flat, widely separating the front coxæ and with two deep foveæ behind the front margin. Casey recognized 22 species, mostly from the dry regions of Arizona and New Mexico, only one extending into our fauna.

556 (8896) ONYCHOBARIS PECTOROSA Lec., 1876, 295.

Oval, convex, narrowed behind. Black, shining, nearly glabrous above; antennæ and legs piceous. Beak thickened toward base, as long as thorax, finely and sparsely punctate. Thorax strongly convex, one-half wider than long, sides feebly converging from base to beyond middle then rounded and narrowed to tip: disc finely and rather densely punctate, more closely and confluently so at sides, and with a very narrow smooth median line. Elytra but one-fourth longer than wide, at base but slightly wider than thorax, sides distinctly converging from base to the rather narrowly rounded apex; striæ deep; alternate intervals slightly wider, their punctures slightly confused, the others with single rows of large, close-set, shallow punctures. Length 3.8—4 mm.

Guilford, Conn., Aug. 24. St. Louis, Mo. Described from Texas. The eastern specimens are more finely sculptured than those from the southwest.

VI. Madarellus Casey, 1892. (Gr., "glossy.")

Here belongs a single medium sized species having the thorax short, broad, abruptly and strongly constricted at apex; first joint of funicle as long as the next four, club elongate-oval, entirely pubescent; front coxæ very remote; prosternum very large, flat, with two deep, more or less coalescent foveæ just behind the front margin and a transverse tumid ridge just behind the coxæ; femora minutely toothed; third tarsal joint broadly bilobed; claws free, somewhat divergent.

Fig. 92. Dorsal and side views. × 8. (After Felt.)

557 (8907). Madarellus undulatus Say, 1823, 315; ibid. II. 177.

Oval, somewhat wedge-shaped. Black, highly polished; thorax often red, very smooth and shining. Beak slender, nearly one-fourth as long as body in female, feebly curved, its sides finely and densely punctate. Thorax two-thirds wider than long, strongly convex, minutely and very sparsely punctate. Elytra narrower at base than thorax, sides distinctly converging from base to apex; striæ very narrow, deep; intervals very finely punctate, those of sides more distinctly and finely rugose. Length 2.7—4.7 mm. (Fig. 92.)

Posey and Monroe counties, Ind., scarce; June 6—June 9. Throughout New Jersey on wild grape, poison ivy and Virginia creeper; August 20—October. Utopia and Dunedin, Fla., March 4—28. Ranges from New England, Michigan and Kansas south to Florida and Texas. The three specimens at hand from southern Indiana and those from Florida have the thorax red, while one from Ithaca, N. Y., is wholly black, thus bearing out LeConte's remarks that the former variety occurs more commonly in southern regions. Easily known by its smooth surface and wedge-shaped undulatory elytra. Felt (1906, 479) states that it "bores woodbine in association with

Fig. 93. Pupal cell of *Madarellus undulatus* Say. × 8. (After Felt.)

Saperda puncticollis Say and transforms to adult in an oval pupal cell composed of finely comminuted, partly decayed pieces of bark and wood glued together." (Fig. 93.)

VII. AULOBARIS LeConte, 1876. (Gr., "cylindrical" + Baris.)

Strongly convex, shining species of elliptic form, having the beak cylindrical, rather slender, as long or longer than thorax; antennæ slender, second joint of funicle nearly as long and stout as the first, fully as long as the next two united, joints 3—7 gradually slightly wider; prosternum deeply, broadly sulcate; third elytral interval with a small oblong spot of pale scales at base; third tarsal joint very wide, deeply bilobed.

KEY TO EASTERN SPECIES OF AULOBARIS.

a. Color not wholly black; sides of thorax broadly rounded.
b. Uniform dark reddish-brown; larger 3.3—3.7 mm. 558. SCOLOPAX.
bb. Head and thorax black, elytra piceous or reddish-brown; smaller, not over 3 mm. 559. PUSILLA.
aa. Color wholly black; sides of thorax strongly rounded.
c. Punctures of elytral intervals, fine, transversely rugose; thorax distinctly constricted near apex. 560. IBIS.
cc. Punctures of intervals coarse, deep, rounded; thorax feebly constricted near apex; prosternal groove produced inwardly near the coxæ. 561. NASUTUS.

558 (8901). AULOBARIS SCOLOPAX Say, 1831, 26; ibid, I, 295.

Oval-elliptic. Dark reddish or chestnut brown; head and under surface darker, the latter with a small yellowish scale-like hair in each puncture. Beak longer than head and thorax, finely and rather sparsely punctate. Thorax one-third wider than long, distinctly, not strongly, constricted near apex, finely and densely punctate, the punctures usually separated by about one-half their own diameters. Elytra at humeri one-fourth wider than thorax, thence distinctly converging to the broadly rounded tips; striæ deep, not punctured; intervals each with a row of shallow, close-set transverse punctures, those of the second and third intervals broadly confused. Length 3.3—3.7 mm.

Frequent throughout southern Indiana, much less so in the northern counties; July 13—Sept. 27; swept from thistle. Not taken near New York City. Ranges from northern Indiana and Wisconsin south to District of Columbia, Georgia and Texas. At Dallas, Texas, on July 3 the "adults were found feeding on the buds of Baldwin's ironweed, *Vernonia baldwini* Torr. and burrowing in the heads of *Carduus*." (*Pierce.*) The thoracic punctures vary considerably in density, and there is often a trace of a median smooth line.

559 (8891). Aulobaris pusilla Lec., 1868, 363.

Oval, convex. Head and thorax piceous-black, shining, elytra paler; antennæ and legs reddish-brown; upper surface with white setæ very minute; each puncture of the under surface bearing an elongate, recumbent, strigose scale. Beak as long as thorax, feebly curved, finely and sparsely punctate. Thorax scarcely wider than long, its punctures small, deep, dense; those of elytral intervals in single rows feeble, close-set, transverse. Length 2.5—3 mm.

Lynchburg, Va., Sept. 6. Described from "Middle States." Recorded from New York, District of Columbia, North Carolina and Iowa.

560 (8902). Aulobaris iris Lec., 1868, 365.

Oblong-oval, robust. Black, strongly shining, the legs sometimes reddish-brown. Antennal club small, oval, subequal in length to the three preceding joints united. Thorax strongly convex, two-fifths wider than long, finely, rather densely and deeply punctate, rarely with a narrow smooth median line. Elytra not wider at base than middle of thorax, sides feebly converging from base to apical fourth, then broadly rounded to apex; striæ deep, intervals with single uneven rows of small shallow punctures. Length 3—3.6 mm.

Bainbridge and Spring Creek, Ga.; July 15—29. Dunedin, Baldwin and Enterprise, Fla.; Nov. 9—Dec. 13. Swept from low meadows. Known also from Orange Mts., N. J., and Mississippi. Taken on thistle by Dury. Specimens in the U. S. Nat. Museum from Haw Creek, Fla., are labelled "*Pseudobaris luctuosa* Casey."

561 (8903). Aulobaris nasutus Lec., 1868, 364.

Oblong-oval, strongly convex. Black, feebly shining. Beak rather slender, strongly curved, as long as head and thorax. Antennal club equal in length to the preceding five joints united. Thorax conical, strongly convex, one-third wider than long, disc finely, deeply, not densely punctate. Elytra scarcely wider than base of thorax; striæ coarse, deep. Length 2.8—3.5 mm.

Agricultural College, Miss.; November. (*Harned.*) Recorded also from Iowa and Kansas. Renamed *naso* by LeConte (1876, 289) but his first name, not being preoccupied in the genus in which it was placed, will have to be reinstated.

VIII. Ampeloglypter Lec., 1876. (Gr., "vine" + "engraver.")

Small oblong or sub-oval species resembling *Madarellus* in the smooth, shining and undulatory surface of elytra, but differing in the shorter and stouter beak, unarmed front femora and in having the tarsal claws connate at base. The antennal club is elongate-oval and pubescent; elytra slightly wider than thorax,

with prominent callus near the declivity; front coxæ small, very widely separated; prosternum with a wide, deep abrupt excavation near the front margin. Our three species live on the stems of grapevines and allied plants, on which the larvæ produce gall-like excrescences.

KEY TO SPECIES OF AMPELOGLYPTER.

a. Black, tarsi reddish-brown.
b. Sides of thorax parallel in basal two-thirds, suddenly strongly rounded near tip; elytra not more than twice as long as thorax; antennæ reddish-brown. 562. ATER.
bb. Sides of thorax converging from base to near apex, the latter one-half as wide as base; elytra nearly two and a half times as long as thorax; antennæ black or piceous. 563. LONGIPENNIS.
aa. Pale reddish-brown throughout; thorax narrower than in *ater*, the sides feebly converging. 564. SESOSTRIS.

562 (8905). AMPELOGLYPTER ATER Lec., 1876, 300.

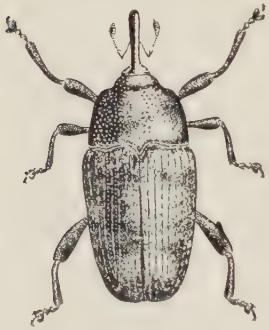


Fig. 94. × 10. (After Brooks.)

Oblong, moderately convex. Black, shining, antennæ and tarsi reddish-brown. Beak robust, strongly curved, slightly longer than thorax in male, finely and rather sparsely punctate. First joint of funicle as long as the next three; second as long as wide. Thorax one-third wider than long, its apex abruptly and strongly constricted, subtubulate; disc finely and sparsely punctured, the sides finely rugulose. Elytra slightly wider at base than thorax; striæ very fine, deep, not punctate; intervals flat, smooth, Under surface rather coarsely and very densely punctate. Length 2.7—3 mm. (Fig. 94.)

Marshall, Posey and Perry counties, Ind., scarce; May 21—June 15. Cape May Court House, N. J., May 26. Ranges from New England to Michigan and southward. Occurs on Virginia creeper, *Parthenocissus quinquefolia* L., the larvæ forming a gall on the stems. Named *Madarus ampelopsis* by both Walsh (1869, 105) and Riley (1869, 132) but not described.

563 (11,144). AMPELOGLYPTER LONGIPENNIS Casey, 1892, 549.

Resembles *ater* but larger, sub-oval, with longer elytra. Distinguished by characters given in key and by having the beak one-half longer than thorax in female; second joint of funicle distinctly longer than wide; elytral striæ finely and remotely punctate at bottom. Otherwise as in *ater*, with which it is easily confused. Length 3—3.3 mm.

Described from Pennsylvania, Maryland and Nebraska. Recorded also from District of Columbia and South Carolina. The

form of the thorax is quite similar to that of *sesostris* but it is much more finely and sparsely punctate.

564 (8904). AMPELOGLYPTER SESOSTRIS Lec., 1868, 364.

Elongate-oval, moderately convex. Pale reddish-brown throughout, strongly shining. Beak rather slender, strongly curved near base, one-half longer than thorax, female, finely striate-punctate. Antennæ inserted just behind the middle; second joint of funicle one-half longer than third. Thorax feebly narrowed from base to apical third, then broadly rounded and constricted; disc finely, rather sparsely and unevenly punctate. Elytra slightly wider and twice as long as thorax, less undulatory than in *ater*; striæ fine, not punctate; intervals wide, flat, minutely alutaceous, their punctures visible but very fine. Under surface except middle of abdomen, densely and rather coarsely punctate. Length 2.7—3 mm. (Fig. 95.)

Jackson and Posey counties, Ind., scarce. May 11—May 20. Beaten from wild grapes. Recorded from Michigan, Ohio and Illinois. Riley (1869, 131) called this the "grape-cane gall curculio," stating that it preys upon the canes of the Concord grape, forming in autumn an elongate knot or swelling just above or below a joint. The larva inhabits this gall, pupating within it in June, the adult emerging in two weeks. He bred a species of Chalcis fly from the galls, and suggested as a remedy the cutting and burning of the infested twigs in winter.

Fig. 95. × 12. (After Brooks.)

IX. DESMOGLYPTUS Casey, 1892. (Gr., "chain" + "engraved.")

Closely allied to *Pseudobaris*, the prosternum being similarly deeply and abruptly sulcate throughout its length, but differing in elytral sculpture from anything else in the tribe. The opaque surface, deeply impressed and strongly crenulate striæ, with narrow, convex intervals, together with the unusually prominent subapical umbones, are unique; while the narrow, subcylindrical form of the body reminds one of *Cylindrocopturus*.

565 (8906). DESMOGLYPTUS CRENATUS Lec., 1876, 300.

Elongate, subcylindrical. Pale reddish-brown, opaque. Beak curved, as long as head and thorax, finely and sparsely punctured. Thorax nearly as long as wide, sides parallel in basal two-thirds, feebly rounded and strongly constricted near tip; disc coarsely and very densely punc-

tured, the sides of constriction with a transverse row of larger punctures. Elytra slightly wider and nearly twice as long as thorax, sides parallel to apical third, surface broadly impressed behind the base; striæ deep, very coarsely punctured; intervals narrow, strongly convex, third and ninth carinate and confluent near tip, so as to leave a deep fovea between their junction and the posterior callosity, which is well marked. Beneath coarsely, the middle of abdomen more finely, punctate. Length 2.7—3.1 mm.

Described from Maryland and Virginia. Known also from District of Columbia and Arizona. Occurs on wild grape.

X. Pseudobaris Lec., 1876. (Gr., "false" + Baris.)

Usually narrow, subcylindrical, convex species having the club of antennæ entirely pubescent; front coxæ widely separated; prosternum deeply and abruptly sulcate along the middle; body above almost glabrous; pygidium large, convex and prominent, not inflexed beneath and not at all covered by the elytra; tarsal claws approximate, connate at base.

KEY TO EASTERN SPECIES OF PSEUDOBARIS.

a. Elytral vestiture generally short and sparse without long white scales.

b. Elytra with a small white pubescent spot at base of third interval.

c. Thorax coarsely, deeply and rather sparsely punctate, without median smooth line; antennæ and tarsi black. 566. LUCTUOSA.

cc. Thorax coarsely, densely and shallowly punctate, the median smooth line distinct; antennæ and tarsi reddish-brown. 567. SOBRINA.

bb. Elytra without pale basal spot on third interval.

d. Form more broadly oval; punctures of elytral intervals large, deep, rounded and conspicuous, especially towards base; length 4.3 mm. 568. PECTORALIS.

dd. Form slender, cylindrical; punctures of intervals small, feeble, remote and transversely rugulose; length 2.6—3.3 mm. 569. ANGUSTA.

aa. Elytral vestiture consisting of very small inconspicuous setæ and long, white, widely scattered scales, the pale spot at base of third interval distinct; length 2.5—3.5 mm. 570. NIGRINA.

566 (11,145). Pseudobaris luctuosa Casey, 1892, 554.

Oblong-oval, strongly convex. Black, strongly shining. Beak rather slender, moderately curved, as long as thorax, finely punctured above, more coarsely on sides. Thorax short, nearly one-half wider than long, sides nearly parallel from base to middle, then broadly curved and narrowed to apex; disc coarsely, very deeply and rather sparsely punctate. Elytra as wide and nearly twice as long as thorax, striæ coarse, very deep, feebly punctate; intervals wide, flat, each with a single row of shal-

low, rather remote, transversely rugose punctures; setæ invisible except a small spot of white scales at base of third interval. Length 3.5—4.2 mm.

Cedar Keys and Lake Ashley, Fla., not rare on swampy meadows. (*Schwarz.*) Described by LeConte as *Aulobaris anthracina* Boh. and cited in the Florida list under the same specific name. Casey pointed out a number of characters in which it differed from Boheman's description, and redescribed it under the name given, stating that until Boheman's type was consulted the status of *anthracina* was indeterminable.

567 (——). PSEUDOBARIS SOBRINA sp. nov.

Oblong-oval, subdepressed. Black, shining, antennæ and tarsi reddish-brown. Beak stout, strongly curved, about as long as thorax, male, as head and thorax, female, sides densely and coarsely reticulate-punctate, above with fine elongate punctures and a median carina on basal half. Thorax one-third wider than long, sides feebly curved and converging from base to apical third, then slightly rounded and constricted near apex, disc sculptured as mentioned in key, the punctures on sides confluent, the median smooth line often abbreviated at each end. Elytra oval, slightly wider at base than thorax; striæ rather fine, deep; intervals slightly concave, each with a row of coarse, shallow, close-set punctures, the second wider, with punctures more or less confused, the third with a distinct spot of white hair-like scales at base; sutural intervals depressed, thus forming an apparent shallow groove the full length of suture. Punctures of under surface very coarse and dense, those of abdomen finer. Length 3.9—4.2 mm. (*W. S. B.*)

Marion, Brown and Posey counties, Ind., scarce; April 30—Sept. 21. Wisconsin; Leng collection. Specimens in the National Museum collection from near Washington, D. C., are labelled *pectoralis* Lec., but the type of that species differs in having no basal spots of white scales, thorax broader and more sparsely punctate, humeral umbone larger and smoother, first sutural interval not depressed. From *nigrina*, with which *sobrina* is doubtless confused in many collections, the latter may be known by its larger size, much stouter form, lack of scattered white scales and much more coarsely punctured beak and thorax.

568 (8887). PSEUDOBARIS PECTORALIS Lec., 1876, 420.

Rather broadly oval, subdepressed. Black, strongly alutaceous, subopaque. Beak slender, as long as thorax, male, slightly longer, female, evenly curved, coarsely punctured on sides, more finely above. Thorax one-half wider than long; disc with an indistinct smooth median line, its punctures coarse, deep, unevenly distributed. Elytral striæ coarse, deep, feebly punctate; intervals one-half wider than striæ, their coarse punctures more or less confused, those of fourth interval and sometimes also of second and sixth, in single rows. Length 4.3—4.5 mm.

Described from New Smyrna, Fla. Recorded elsewhere only from D. C., but this record is erroneous as stated above.

569 (8890). PSEUDOBARIS ANGUSTA Lec., 1868, 363.

Narrowly oval or subcylindrical. Deep black, shining. Thorax about as long as wide, sides parallel from base to beyond middle, broadly constricted near apex; disc rather coarsely, densely punctate, without median smooth line. Elytral striæ fine, very deep; intervals each with a single row of small, feeble, distant transverse punctures. Length 2.6—3.3 mm.

Lake County, Ind., rare; June 21. Hopatcong and Snake Hill, N. J.; West Point and Batavia, N. Y. Ranges from New England and Canada to North Dakota, south to Ohio and Kansas. By the absence of white scales, as well as by its slender form, this species is easily separated from *nigrina*.

570 (8888). PSEUDOBARIS NIGRINA Say, 1831, 26; ibid. I, 294.

Elongate-oval, convex. Black, shining, antennæ and tarsi piceous. Beak curved, as long as head and thorax, female, stouter and one-fourth shorter, male, finely and sparsely punctate above, more coarsely on sides. Thorax one-third wider than long, sides parallel on basal third, thence broadly curved and converging toward the feebly constricted apex; disc with a narrow, incomplete median smooth line, deeply and densely punctate, the punctures rather fine, almost in mutual contact. Elytra scarcely wider and twice as long as thorax; striæ deep; intervals flat, equal, each with a single row of rather large, close-set punctures. Under surface coarsely and densely punctate. Length 2.5—3.7 mm.

Common throughout Indiana; April 21—Sept. 24. Swept from herbage in damp meadows. Throughout New Jersey, May —June, on golden-rod. Ranges over the eastern United States.

XI. TRICHOBARIS Lec., 1876. (Gr., "hairy" + Baris.)

Elongate, robust species having the body clothed with prostrate, pale scales which are wanting on the head, in several small areas on the upper surface and in a larger one on the middle of the last two or three ventral segments. They have the antennal club rather small, oval, entirely pubescent; funicle stout, first joint longer, the others subequal and gradually wider; front coxæ narrowly separated, the prosternum broadly and feebly impressed along the middle, nearly as in *Baris*. Legs slender, tibiæ clawed at tip; tarsi with third joint dilated, bilobed, last joint long, claws approximate, connate at base.

KEY TO EASTERN SPECIES OF TRICHOBARIS.

a. Scales of the upper surface slender, not completely concealing the sculpture; thorax without a smooth median line. 571. TRINOTATA.

aa. Scales large, broad, moderately dense; thorax with a narrow, carinate median line; basal denuded spots of thorax not distinct. 572. INSOLITA.

571 (8884). TRICHOBARIS TRINOTATA Say, 1831, 17; ibid. I, 280.

Narrowly oblong, robust. Black, densely clothed with short, linear white prostrate scale-like hairs, those of the disc of thorax pointing toward the median line; those on its flanks oval, much broader; base of thorax each side with a round black spot; scutellum black. Beak coarsely and densely punctate, scaly on basal half, glabrous and almost smooth near apex; stouter, not quite as long as thorax in male; slender and much longer, female. Thorax scarcely wider than long, coarsely and densely punctate. Elytral striæ very fine, intervals each with about three rows of the scale-like hairs. Length 3—4 mm. (Fig. 96.)

Fig. 96. *a*, Beetle; *b*, larva from side; *c*, pupa; *d*, potato stalk opened to show larva and pupa; *a*, *b* & *c* × 5. (After Chittenden.)

Frequent in southern Indiana, much less so in the northern counties, May 14—June 7. Locally common throughout New Jersey, sometimes injurious. Ranges from New York, Canada, Michigan and Colorado, south to Florida. "The larva is the 'potato stalk-borer, which eats out the stalk and prevents the crop maturing. The beetles remain in the stalks all winter, and if the latter are raked up and burned when the crop is harvested the beetles are destroyed. The native food is the nettle." (*Smith.*) Chittenden (1902-a), in a full account of the beetle and its life habits, records it as boring in the stems of a number of other members of the potato family (*Solanaceæ*) some of which, as the jimson-weed, horse-nettle and ground cherry, are noxious weeds; also in those of the cocklebur, *Xanthium canadense* Mill. He credits it as being one of the most important insects enemies of early potatoes in the Central-Western states, calling it the "potato stalk weevil," and also recommends the burning of infested stalks of potatoes and all other Solanaceous weeds in the vicinity.

572 (11,152). TRICHOBARIS INSOLITA Casey, 1892, 565.

Oblong-oval. Black, densely clothed with large, broad, recumbent whitish scales; median parts of third and fourth ventral segments abruptly glabrous. Thorax short, one-half wider than long, its punctures large, deep, circular. Length 4.2 mm.

Described from southern Florida. Recorded by Chittenden (1902-b, 69) as boring in and injuring tobacco stalks near Quincy, Fla.; also by Hamilton (Can. Ent., XXVII, 321) as abundant on ground cherries (*Physalis*) near Lake Worth, Fla., April 10.

XII. Orthoris Lec., 1876.

Elongate-oval, rather slender pubescent species, having the beak slender, nearly straight, antennæ inserted just behind the middle, female, at apical two-fifths, male; prosternum short, impressed at middle, narrowly prolonged between the coxæ which are almost contiguous. In form and vestiture the species resemble those of *Orchestes* rather than their allies among the Barids.

573 (8866). Orthoris crotchii Lec., 1876, 286.

Elongate-oval, subdepressed. Black, subopaque, rather thickly clothed with grayish prostrate hair-like scales; antennæ and tarsi brown. Beak slightly longer than thorax, male; one-half longer, female. Thorax conical, as long as wide, sides straight, converging from base to apex; disc rather finely and densely punctate. Elytra one-third wider at base than thorax, sides straight to apical third, the apex broadly rounded; striæ deep; intervals feebly convex, sparsely, finely and confusedly punctate. Length 3—3.7 mm.

Ottawa, Canada; May 4. Described from California. Known also from Texas and Nebraska. Pierce (1907, 283) records it as breeding in the pods of *Mentzelia nuda* Pursh. at Clarendon, Texas, in August, a large number breeding in each pod, and being attacked by several species of hymenopterous parasites.

Subtribe II. Centrini.

The members of this subtribe have the elytra conjointly rounded at tip or nearly so, thus covering the pygidium which is nearly horizontal, or at most somewhat oblique and never vertical; last ventral regularly rounded, never truncate or emarginate at tip; claws of tibiæ less developed than in Subtribe I, sometimes almost obsolete; beak and antennæ usually longer and more slender than there.

KEY TO EASTERN GENERA OF SUBTRIBE CENTRINI.

a. Body without erect bristles (except in *Zaglyptus*); mandibles normal, their plane of motion horizontal.
  b. Tarsal claws two, free and divergent.
    c. Mandibles prominent, not crossed near tip when closed.
      d. Mandibles with inner edges devoid of denticles or emarginations; form rhomboidal or broadly oval; surface usually

densely scaly.

e. Apex of pygidium entirely hidden; males without sexual modifications of the antennæ. XIII. Centrinus.

ee. Apex of pygidium exposed in both sexes; males with outer joints of antennal funicle obliquely truncate, and the basal joint of club with a large glabrous area on the inner side, at the middle of which there is a tumid or dentiform process; scutellum always densely clothed with white pubescence, this sometimes abraded. XIV. Odontocorynus.

dd. Mandibles with inner edge straight, finely toothed or crenulate.

f. Antennæ inserted behind middle of beak.

g. Front coxæ narrowly separated; body densely scaly; form oblong-oval; smaller, not over 3 mm. XV. Centrinopus.

gg. Front coxæ widely separated; body subglabrous; form broadly oval; length more than 3.5 mm. XVI. Pachybaris.

ff. Antennæ inserted at or in front of the middle of beak ;front coxæ narrowly separated.

h. Thorax not tubulate at apex.

i. Form broadly oval; metasternum very short; body above usually subglabrous. XVII. Microcholus.

ii. Form narrowly oval; metasternum longer; body above densely scaly, the scutellum conspicuously so. XVIII. Nicentrus.

hh. Thorax strongly constricted behind apex, the latter tubulate. XIX. Centrinites.

cc. Mandibles not prominent, thick, curved, crossed when closed, deeply notched at apex.

j. Elytral striæ almost obsolete, each terminating at base in a deep fovea. XX. Oömorphidius.

jj. Elytral striæ normal, not foveate at base.

k. Body without erect bristles; third tarsal joint dilated and bilobed.

l. Metasternum long, much more than one-half as long as its episterna; males often with spines before front coxæ; form narrowly oval. XXI. Limnobaris.

ll. Mestasternum shorter, not more than one-half as long as the met-episterna; prosternum not armed in males, except occasionally in *Idiostethus;* form broadly oval.

m. Antennal club small or moderate; vestiture very sparse but distinct.

n. Thorax not tubulate at apex; prosternum flat. XXII. Oligolochus.

nn. Thorax tubulate; prosternum broadly impressed, deeply excavated in front. XXIII. Idiostethus.

mm. Antennal club very large, nearly as long as funicle; body almost glabrous. XXIV. Stethobaris.

kk. Body subglabrous, but with erect bristles; third tarsal joint slender, not dilated; very small, less than 1.8 mm. XXV. Zaglyptus.

bb. Tarsi with claws connate or single.

o. Claws two, connate in basal half.

p. Beak long, slender, antennæ inserted behind its middle; body subglabrous and with remotely scattered white scales; elytral striæ fine, coarsely punctate; prosternum flat between the coxæ. XXVI. ZYGOBARIS.

pp. Beak short, stout, antennæ inserted beyond its middle.

q. Prosternum flat; body glabrous with minute hairs in the remote punctures. XXVII. ZYGOBARINUS.

qq. Prosternum sulcate; body scaly.

r. Basal joint of funicle moderate, not longer than the next three united; elytra with large, remotely scattered white scales; length less than 2.5 mm. XXVIII. CATAPASTUS.

rr. Basal joint longer than the next four united; elytra without scattered single scales; length more than 3 mm. XXIX. BARINUS.

oo. Claws single; body very slender, subcylindrical. XXX. BARILEPTON.

aa. Body with erect bristles, intermixed with the dense covering of scales; mandibles almost vertical.

s. Beak one-half to three-fourths the length of the body, very slender; erect setæ spiniform and conspicuous. XXXI. EUNYSSOBIA.

ss. Beak shorter, but slightly longer than head and thorax, without basal constriction; erect bristles much shorter. XXXII. PLOCAMUS.

XIII. CENTRINUS Schön., 1826. (Gr., "central.")

A large genus of small or medium sized, rhomboidal or rhomboid-oval, more or less scaly species having the mandibles elongate, prominent, not crossed in repose, their inner edges never toothed; beak usually cylindrical, long and slender; thorax narrowed and more or less constricted in front; elytra wider than thorax, narrowed toward apex; femora unarmed; tarsal claws free, divergent.

KEY TO EASTERN SPECIES OF CENTRINUS.

a. Male with an erect or oblique process before each of the front coxæ; scape not reaching the eye.

b. Front coxæ narrowly separated; body robust.

c. Beak thick, the antennæ inserted near or beyond its middle, in male, behind middle, in female; thorax strongly tubulate at apex; length 4 or more mm.

d. Elytral intervals wide and flat, the alternate ones more densely clothed with white pubescence, giving them a striped appearance; punctures of thorax very small, dense and tending to coalesce lengthwise. 574. LÆVIROSTRIS.

dd. Elytral intervals narrower, sprinkled with scattered broad, oval white scales; punctures of thorax coarse, rather sparse

and tending to coalesce obliquely; prosternal processes very feeble elevations of the front margin of coxal cavities.

575. MODESTUS.

cc. Beak very slender, antennæ inserted far behind its middle; elytra evenly and rather densely clothed with pale scales; prosternal processes of male long, slender, feebly curved horns; smaller, not over 2.7. mm.

e. Scales of upper surface elongate, slender, usually of a dirty yellow hue; body robust; basal joint of funicle almost as long as the next four in the female. 576. PICUMNUS.

ee. Scales of upper surface more broadly oval, white; body smaller and narrower; basal joint of funicle shorter, about as long as as the next three in female. 577. ALBOTECTUS.

bb. Front coxæ widely separated; beak rather slender, antennæ inserted at or behind its middle.

f. Beak long, slender, about one-half the length of body.

g. Upper surface clothed with white and darker scales intermixed; elytra with two small, subapical dark spots.

578. GRISESCENS.

gg. Upper surface clothed with scales of a uniform color; elytra without subapical dark spots.

h. Surface black, densely clothed with whitish scales; scutellum flat, sparsely scaly; length 3.7—4 mm.

579. PERSCILLUS.

hh. Surface pale brownish-yellow, the scales dirty yellow; legs pale reddish-brown. 580. CLARESCENS.

ff. Beak short, thick, barely as long as head and thorax, cylindrical, nearly equal in diameter from base to apex; elytra reddish-brown, thinly clothed with narrow clay-yellow scales, with a few widely scattered larger white ones; length 2.5—2.7 mm.

581. PERSCITUS.

aa. Male without process or other sexual modification of prosternum; scape almost reaching the eye.

i. Elytra each with two or more spots of dark scales near apex; front coxæ rather widely separated; body densely clothed with dull yellow scales; antennæ inserted behind the middle of beak in both sexes. 582. PENICELLUS.

ii. Elytra without dark spots near apex; front coxæ separated by only one-third their own width; antennæ inserted beyond the middle of beak. 583. FALSUS.

574 (8921). CENTRINUS LÆVIROSTRIS Lec., 1876, 309.

Oval, robust, convex. Dark reddish or chestnut brown, shining; antennæ, tibiæ and tarsi paler; above rather thinly clothed with small, slender brown and larger elongate-oval pale scales, the latter covering the sides and middle of basal half of thorax and condensed along the first, fifth and seventh intervals of elytra; beneath densely clothed with large white scales. Beak as long as head and thorax curved, tapering, deeply rugosely punctured and scaly on sides near base, elsewhere nearly smooth and glabrous; antennæ inserted just behind its middle, male, at basal third, female. Second joint of funicle one-half as long as first,

nearly as long as the next two united. Thorax convex, one-fourth wider than long, narrowed from the base, sides broadly rounded, constricted near apex, disc punctured as described in key and with a narrow, smooth median line. Elytral striæ rather fine, not deep, feebly punctate; intervals wide, flat, finely and densely rugosely punctate. Prosternum of male with a large, deep, oval median excavation in front of coxæ and with a long, curved, pointed horn each side the cavity. Length 4.5—6.2 mm.

Lake Co., Ind., scarce; May 24—June 10. Originally described from a single male from Missouri. No other record of its occurrence can be found. LeConte described the type as black; Casey gave its color as piceous; but the type and all the ten specimens at hand are dark brown, the head alone piceous. Easily known by the vittate elytra, large size and prominent prosternal modifications of the male.

Centrinus striatirostris Lec., (1876, 309). Short-oval, very robust; dark brown, above sparsely clothed with elongate whitish scales arranged transversely on thorax and condensed each side of scutellum on elytra; thorax nearly twice as wide as long, obliquely striate; elytra with coarse, deep, punctate striæ and flat, coarsely punctate intervals. Length 4.4—4.6 mm. A Texan species, recorded, probably erroneously, by Dury from Cincinnati, Ohio. He states that the specimen was so named for him by Dr Horn, but is not now in his cabinet.

575 (8924). CENTRINUS MODESTUS Boh., Schön., 1836, 772.

Oval, robust, strongly convex. Dark brown or piceous, sparsely sprinkled with broadly oval white scales and narrower brownish ones above, and more densely clothed with whitish scales beneath. Beak nearly half as long as body, rather stout, evenly curved, coarsely punctate and striate on sides, sparsely and finely punctate above. Second joint of funicle one-half as long as first, slightly longer than third. Thorax wider than long, strongly constricted near apex; disc with a narrow median smooth line, punctate as mentioned in key. Elytra oval, their sides strongly converging from near base; striæ deep; intervals coarsely punctate, each puncture enclosing a large white scale. Prosternum of male with a deep smooth impression near front margin, the coxal processes as described in key. Length 4—4.5 mm.

Dunedin, Fla., Nov. 9. Recorded from "Middle and Western States" by LeConte; also from Pennsylvania, Ohio and Florida. "In well preserved specimens a small spot of dense scales is evident each side of scutellum and another just before each humeral callus." (*Casey.*)

576 (8928). CENTRINUS PICUMNUS Herbst, 1797, 30.

Oval, convex. Dark chestnut brown to black, legs paler; above densely and uniformly clothed with long, more or less narrow, pale clay-yellow to whitish scales; those of under surface paler, denser and much wider. Beak slender, one-half as long as body, tapering, strongly

curved, that of male finely striate-punctate; of female finely and densely punctate on basal third, minutely and sparsely punctate, strongly polished on outer two-thirds. Antennæ inserted far behind the middle; second joint of funicle one-half longer than third. Thorax conical, one-half wider than long, narrowed from base, feebly constricted near apex; disc finely and very densely punctate, its scales arranged obliquely. Elytra at base slightly wider than thorax, thence gradually narrowed to the rounded apex; striæ deep, punctured; intervals flat, densely punctate, each with two or three rows of scales. Prosternum of male narrowly and very deeply excavated along the middle, with a short, erect, curved pointed horn before each coxæ. Length 2.1—2.7 mm.

Very common throughout southern Indiana, not taken north of Vermillion and Hamilton counties; April 23—Sept. 24. Beaten from dogwood blossoms on the former date; taken from flowers of white snake-root, *Eupatorium ageratoides* L. on the latter. Common throughout New Jersey, June to August, on flowers. West Point, N. Y. Ormond, Eustis and Dunedin, Fla.; Jan. 26—Nov. 25. Ranges from New England to Nebraska, south to Florida and Arizona. Varies in the color of the upper surface, the elytra sometimes being dull reddish-brown and again shining black; also in the color and density of the scales, those of the black specimens being paler and less dense. Infests the stems of yellow fox-tail grass, *Chætochloa glauca* L. and has been taken on many other plants. (*Webster.*) Not rare on palmetto blossoms in Florida. (*Schwarz.*)

577 (11,157). CENTRINUS ALBOTECTUS Casey, 1892, 582.

Rather narrowly oval, convex. Black, densely and uniformly clothed with rather wide white scales, which are but slightly broader and denser beneath. Beak scarcely longer than head and thorax in male, one-half as long as body in female. Male with a long, very slender finely acuminate horn before each coxa, the process being inclined forward and very feebly curved; also a small, semi-glabrous flattened spot near base of abdomen, in which the scales become sparse but not erect or divided as in similar spot of *picumnus*. Length 1.7—2.3 mm.

Anglesea, N. J., July. Sanford, Fla., scarce; Apr.5—9. Described from Florida and Texas. Known also from Mississippi and District of Columbia. "Distinguished from *picumnus* by its broader white scales, shorter beak, smaller size and more slender form." (*Casey.*)

578 (11,158). CENTRINUS GRISESCENS Casey. 1892, 583.

Rhomboidal, elliptical, convex. Dull black, densely clothed beneath with large, wide, yellowish-white scales, above with narrower luteous white scales, with a few dark brown ones intermingled, the latter more evident in two more or less distinct spots near apex. Beak strongly cur-

ved, not quite one-half as long as body; second joint of funicle much shorter than the next two united. Thorax slightly wider than long, sides converging and nearly straight in basal two-thirds, then rounded to the feeble apical constriction; disc rather coarsely, deeply and very densely punctate, with a narrow, smooth median line. Elytral striæ fine, deep; intervals flat, three or four times as wide as striæ, their punctures confused, rather coarse, rugose. Male with a very short, erect, acuminate horn before each front coxa. Length 3.5—4.1 mm.

Marion County, Ind., rare; May 17. Described from Asheville, N. C., Ohio, Illinois and Missouri. "Very close to *neglectus* Lec. (found in Texas, Louisiana and Kansas) but differs in its whitish (not dark yellow) vestiture, the broad distinct impression of the prosternum in both sexes, and the more narrowly separated front coxae." (*Casey.*) Closely allied also to *perscillus*, and a large series would perhaps show that *neglectus*, *griseseens* and *perscillus* are one species, the last name having priority.

579 (8925). CENTRINUS PERSCILLUS Gyll., Schön., 1836, 762.

Elliptical, robust, feebly flattened above. Black, densely clothed above and beneath with grayish-white, elongate scales; antennæ, tibiæ and tarsi dark reddish-brown. Beak slender, one-half as long as body, very strongly and evenly curved, striate and punctate, feebly carinate on basal half above; antennæ inserted at middle, scape reaching two-thirds the distance to eyes, male; just behind middle, the scape slightly longer, female; second joint of funicle slender, one-half the length of first. Thorax slightly wider than long, male, one-third wider than long, female; sides feebly converging from base to apical third, then more rapidly to apex, which is very feebly constricted; disc finely and densely punctate, with a very narrow median smooth line. Elytra at humeri distinctly wider than thorax, thence obviously narrowing to apex; striæ fine, deep; intervals densely granulate-punctate. Male with a short, obtusely pointed horn before each front coxa. Length 3.7—4 mm.

Dunedin and Jacksonville, Fla., Nov. 9. Recorded by Casey from Kansas and Minnesota; by Ulke from District of Columbia. The above description is mainly that of a Kansas male identified by Casey for Mr. Leng, the specimen agreeing in most points with Gyllenhal's rather indefinite original description.

580 (11,161). CENTRINUS CLARESCENS Casey, 1892, 586.

Narrowly oval, convex. "Pale rufo-testaceous throughout, the scutellum, head and beak piceous; vestiture of rather large, moderately elongate, ochreous-yellow scales, rather dense and uniformly distributed above, very dense and broader beneath. Beak of male nearly one-half the length of body, strongly, evenly curved, punctured and sparsely scaly behind the antennæ, shining, polished and almost impunctate elsewhere. Joints 1 and 2 of funicle equal in length, the second much

the more slender, as long as the next two united. Thorax one-half wider than long; disc rather coarsely, densely and rugosely punctate and with a faint smooth median line. Elytral striæ deep, rather fine; intervals densely, confusedly and rugosely punctate. Male with a short, stout, erect process before each front coxa. Length 2.9 mm." (*Casey.*)

Described from the District of Columbia.

581 (8929). CENTRINUS PERSCITUS Herbst, 1797, 28.

Oval, convex. Piceous-brown, the elytra, beak, antennæ and legs rufous; above rather thinly clothed with narrow, dull yellow scales, denser along sides of thorax; elytra with a few larger and whiter, widely scattered scales. First joint of funicle as long as the next three, second not twice as long as wide; club as long as the five preceding joints combined. Thorax nearly two-thirds wider than long, feebly converging and slightly curved on basal two-thirds, then broadly rounded, converging to apex; disc densely not coarsely punctured. Elytral striæ fine, deep; intervals flat, three to four times wider than striæ, finely and rugosely punctate. Prosternum of male narrowly, deeply excavated, with a short, stout, tapering erect process before each coxa. Length 2.5—2.7 mm.

Recorded from New Jersey by Casey. Ranges from New Jersey and District of Columbia, west to Nebraska, south to Georgia and Texas. Bruner (1891, 16) records this and the next species as gnawing small holes in the leaf stems of sugar beets at Lincoln, Nebraska.

582 (8918). CENTRINUS PENICELLUS Herbst, 1797, 29.

Oval or subrhomboidal, feebly flattened above. Piceous-black, densely clothed with narrow, pointed, dull yellowish scales, those of thorax arranged transversely, those of elytra forming two or three nearly regular rows on each interval; each elytron usually with three submarginal dark spots on apical two-thirds, one or two of these sometimes almost or wholly wanting; beak, antennæ, tibiæ and tarsi dark reddish-brown. Beak slender, compressed, half as long as body, finely striate-punctate on sides, polished and almost impunctate above. Antennæ inserted just beyond basal third; second joint of funicle slender, nearly as long as the next two, the latter equal. Thorax one-fourth wider than long, sides feebly converging from base to middle, then broadly rounded to near apex, which is subtubulate; disc densely and rather coarsely punctate, slightly carinate at middle. Elytra at humeri distinctly wider than thorax, thence narrowed to the conjointly rounded apex; sculpture hidden by scales. Length 3.5—3.8 mm. (Fig. 97.)

Fig 97. × 6. (After Hunter & Hinds.)

Southern half of Indiana, scarce; not taken north of Hamil-

ton Co.; June 25—July 21. Frequent in southern New Jersey, June—September. Ranges from New York to Iowa and Nebraska, south to Florida and Louisiana. In five of the nine specimens at hand there are three dark spots on each elytron, in two the humeri are also dark, while one has a faint trace only of the subsutural apical spot, all the others being wanting.

583 (8938). CENTRINUS FALSUS Lec., 1876, 315.

Elongate-oval, convex. Black, legs reddish-brown; rather thinly clothed above with slender yellowish scales, sparse on thorax, closer on elytra, where they tend to aggregate in a broad line along the middle of the intervals; beneath more densely clothed with broader whitish ones. Beak rather stout, cylindrical, as long as head and thorax, distinctly curved near base, strongly punctured, male, more finely, female; second joint of funicle one-half as long as first, as long as the next two. Thorax much wider than long, sides feebly curved in basal two-thirds, then strongly rounded and slightly constricted near tip; disc finely and densely punctate, the median smooth line distinct. Elytral striæ fine, deep; intervals wide, densely punctate, the narrow scales not arranged in rows. Prosternum with a transverse subapical constriction, and a rather narrow, deep sulcus along the middle. Length 3.6—4 mm.

Described from the "Middle and Southern states." (*LeConte.*) Alabama and Iowa. (*Casey.*)

XIV. ODONTOCORYNUS Schön., 1844. (Gr., "tooth" + "club.")

Oval or subrhomboidal robust species, having the antennal funicle and club of male modified as mentioned in generic key; basal impression of beak almost obsolete; front coxæ narrowly separated, the prosternum usually with a deep transversely oval pit behind its front margin.

KEY TO EASTERN SPECIES OF ODONTOCORYNUS.

a. Beak nearly similar in form in the male and female; body rhomboid-oval, sparsely scaly, more or less reddish in female, black in male. 584. SCUTELLUM-ALBUM.

aa. Beak of male compressed, deeply striate and strongly punctate on sides, abruptly bent near base; of female, cylindrical, polished, almost impunctate and more evenly curved.

b. Punctures of elytral striæ bearing inconspicuous scales.

c. Larger, 5.2—6 mm.; punctures of elytral intervals deep, coarse, rounded, distinctly defined, each bearing a small white scale. 585. DENTICORNIS.

cc. Smaller, not over 4.7 mm.; form less robust and more parallel; punctures of intervals closer and confused.

d. Scales of elytral intervals small, white, lying within the punctures; antennal club small, oval. 586. SALEBROSUS.

dd. Scales of intervals large, yellowish, almost concealing the

punctures; club large, robust, as long as the five preceding joints combined. 587. PINGUESCENS.

bb. Punctures of elytral striæ with broad, distinct scales; length 4.5—5 mm. 588. PULVERULENTUS.

584 (8917). ODONTOCORYNUS SCUTELLUM-ALBUM Say, 1831, 21; ibid, I. 287.

Subrhomboidal, convex, robust. Male black, antennæ and tarsi reddish-brown; female with a more or less reddish tinge; above sparsely clothed with small, narrow white scales; those of under surface and scutellum broader and more dense. Beak slightly curved, strongly so near base, one-half as long as body, the sides somewhat flattened and coarsely striate-punctate. Antennæ inserted near apical third; second joint of funicle nearly as long as the next three. Thorax wider than long, sides broadly rounded, disc very feebly constricted near tip, finely, deeply and densely punctate. Elytra distinctly wider and three-fourths longer than thorax; striæ coarse, deep; intervals very coarsely, rugosely punctate, each puncture bearing a small scale. Prosternum with a large, transverse excavation just behind the apex; basal joint of club of male with a large glabrous polished area on inner side which bears an erect acute process; female with thorax shorter, its punctures larger and sparser, the antennal club simple. Length 3—4.7 mm.

Frequent throughout Indiana; June 12—Aug. 17. Common throughout New Jersey, July, on daisies; also on *Houstonia*, *Melilotus*, *Rudbeckia*, *Helianthus*, etc. Ranges from New England to Colorado, south to Florida and Texas.

585 (11,166). ODONTOCORYNUS DENTICORNIS Casey, 1892, 597.

Oblong, subrhomboidal, very robust. Black, shining; thorax sparsely clothed with very small, slender white scales, denser toward the sides and on the base; elytra with similar broader scales, each lying within the deep, rounded punctures of the intervals; under surface densely clothed with much larger white scales; antennæ, tibiæ and tarsi dark reddish-brown. Beak as described in key; antennæ inserted near its apical third, scape bent and club-shaped near apex; second joint of funicle three-fourth as long as first, one-half longer than third. Thorax large, convex, sides strongly rounded, disc with deep, rounded, very close-set punctures and a faint median smooth line. Elytra distinctly wider and about two-thirds longer than thorax, sides strongly converging from the large, prominent humeri; striæ coarse, deep, punctate. Male with basal joint of club as in *scutellum-album*, its smooth space obtusely dentate. Length 5.3—6 mm.

Occurs throughout northern and western Indiana, but scarce; June 8—Oct. 1. Beverly Heights, Ill., June 15. Described from North Carolina and Kansas. Taken in numbers by Pierce (1907, 284) on flowers of *Rudbeckia hirta* L. and *Saturcia hortensis* L. at Logansport, La., in June; also on *Verbesina*, *Achillea*, *Solidago* and *Kuhnistera* in Texas and Oklahoma. Resembles *scutellum-album*, with which it is doubtless confused in many

collections. Aside from the differences given in the key, it is distinguished by the thorax being more convex, with sides more rounded, its punctures, as well as those of intervals, deeper and rounder, their sides less polygonal; under surface more densely scaly, size larger and both sexes shining black.

586 (11,167). ODONTOCORYNUS SALEBROSUS Casey, 1892, 598.

Oblong-oval, convex. Black, dull; legs and antennæ more or less reddish-brown; vestiture above variable, consisting of either slender sparse, scale-like hairs, or robust, oval, conspicuous whitish scales; those of under surface broad and very dense. Beak and antennæ much as in *denticornis*. Thorax less convex, sides nearly parallel on basal two-thirds, then broadly rounded and converging to apex; disc densely and finely punctate. Elytral striæ deep, rather coarse; intervals with confused coarse punctures. Basal joint of club of male as in *denticornis*. Length 2.9—4.7 mm.

Throughout Indiana, but scarce; June 3—July 15. Orange, N. J., April. Dunedin, Fla., Apr. 4—Dec. 3; swept from huckleberry. Ranges from New York to Colorado, south to Florida and Texas. Collected on *Aster*, Apr. 28 in Louisiana; on *Asclepias*, May 25, and on *Achillea lanulosa* Nutt., May 24, in Texas and Oklahoma. (*Pierce.*) Closely allied except in size to *denticornis*, and will probably prove to be but a dwarf variety of that species. Casey in his description states that the disc of thorax is "devoid of impunctate line," but a specimen determined by him in the Leng collection shows such a line very distinctly.

586 (11,167). ODONTOCORYNUS SALEBROSUS Casey, 1892, 598.

Oblong, oval, robust. Dull black, antennæ, tibiæ and tarsi reddish-brown; above and beneath thickly clothed with large oblong-oval yellowish scales, those on the intervals arranged in two or three irregular rows and nearly concealing the sculpture. Beak slightly longer than head and thorax, deeply, coarsely and rugosely punctate, male; one-third longer, more strongly curved, finely and sparsely punctate, female. Thorax two-thirds wider than long, sides broadly rounded, feebly constricted near apex; disc finely and very densely punctate, each puncture bearing a narrow yellowish prostrate scale. Elytra oblong, slightly wider and two-thirds longer than thorax; sides distinctly converging from base to near apex; striæ coarse, deep; intervals flat, twice as wide as the grooves, coarsely and rugosely punctate. Length 3.8—4.3 mm.

Brown, Orange and Harrison counties, Ind., scarce; June 11—24. Described from Arkansas. The large yellowish scales and long robust club easily separate this species from *salebrosus*.

588 (11,169). ODONTOCORYNUS PULVERULENTUS Casey, 1892, 600.

Oval, subrhomboidal, convex. Black, antennal funicle gradually reddish toward apex; scales of upper surface whitish, sparse, closer

along apical margin of thorax; those of elytra larger, elongate-oval, each lying within a large oval puncture. Beak nearly as long as elytra in female, antennæ inserted beyond its middle, second joint of funicle two-thirds as long as first, slightly shorter than the next two. Thorax one-half wider than long, sides broadly, nearly evenly curved from base to apex, disc rather coarsely, deeply and densely punctate. Elytra wider and about twice as long as thorax; striæ coarse; intervals flat, coarsely punctate. Prosternum with a deep, transverse oval pit just behind the apical margin in both sexes; basal joint of club in male with a short, acute, erect tooth. Length 4.5—5 mm.

Described from North Carolina, Colorado and Texas. Collected on *Rudbeckia* in May, and on *Anogra pallida* Lindl. in April, in Texas. (*Pierce.*)

XV. Centrinopus Casey, 1892. (Gr., Centrinus + "legs.")

Small oblong oval, densely scaly species having the inner edge of mandibles straight, distinctly notched near apex; beak slightly longer than head and thorax, very slender, strongly curved; antennæ inserted near its basal third, scape short, reaching almost to eye, first joint of funicle as long as the next three, second but slightly longer than third, club oval, pointed, its basal joint unusually large; prosternum of female deeply channeled along the middle, that of male with a still deeper elongate-oval excavation and a short, abruptly bent horn before each coxa; scutellum very small, densely scaly; pygidium completely covered in both sexes.

589 (11,170). Centrinopus helvinus Casey, 1892, 602.

Oblong-oval, convex. Head, thorax, under surface and often the femora piceous; elytra reddish-brown; antennæ, tibiæ and tarsi paler; above rather densely clothed with clay-yellow hair-like scales, those of thorax arranged transversely, and on sides and median line condensed to form narrow stripes; those of elytra somewhat broader and more dense along the third, fifth and seventh intervals; under surface very densely clothed with larger, oval white scales. Beak shining, almost impunctate above, finely striate and rather coarsely punctate on sides. Thorax one-third wider than long, sides nearly straight and feebly converging from base to apical third, then broadly rounded and more strongly converging to apex; disc densely, rather coarsely punctate. Elytra at humeri about one-fifth wider than thorax, thence gradually narrowing to the rounded apex; striæ fine, rather deep; intervals flat, the alternate ones slightly wider, and with three instead of one or two irregular rows of scales. Length 2—2.7 mm.

Starke, Perry and Posey counties, Indiana, scarce; May 23—Aug. 23. Swept from low, moist meadows. Six specimens in Leng (formerly Julich) collection labelled "Indiana" and "Casey."

without more definite locality, but probably part of Casey's cotypes, of which more than one hundred specimens came from Indiana and Illinois. Known also from Iowa and southwestern Pennsylvania, where it was taken by Hamilton on joe-pye weed, *Eupatorium purpureum* L. Casey gives the color as "dark piceous," but the elytra in all specimens at hand are distinctly reddish, some of them with a narrow, piceous sutural line.

Centrinopus alternatus Casey, (1892, 602) differs only in having the pale scales of thorax more condensed on sides and median line, with the intervening scales slightly darker, the three vittæ, therefore more distinct; those on elytral intervals 3, 5, and 7 also more dense, giving the elytra a distinctly striped appearance. The Maryland specimen mentioned by Casey as being in the Julich collection is at hand, and there is no appreciable difference between it and *helvinus* except that of the distribution of pubescence. We therefore regard it as only a nominal variety of the latter.

XVI. Pachybaris Lec., 1876. (Gr., "thick" + Baris.)

Short, robust, almost glabrous species having the beak slender, strongly curved, as long as head and thorax, female, striate, the punctures above arranged in rows; antennæ inserted far behind its middle, their grooves beginning near tip of beak, running obliquely downward and almost confluent on the under side; scutellum flat, almost circular; prosternum flat, broad between the coxæ with two deep foveæ connected in front by a groove.

590 (8909). Pachybaris porosa Lec., 1876, 302.

Broadly oval, robust, convex. Black, polished; beak, legs and antennæ dark reddish-brown. First joint of funicle as long as the next four united. Thorax short, two-thirds wider than long, sides parallel on basal third, then broadly rounded and feebly constricted to apex; disc very convex, finely alutaceous, coarsely, deeply and rather sparsely punctate. Elytra about as long as wide, scarcely wider and three-fourths longer than thorax, narrowing from the rather prominent humeri to apex; striæ wide, deep, feebly punctate; intervals flat, each with a row of large, close-set punctures, bearing very short, prostrate brownish hairs. Under surface coarsely punctate, each puncture with a similar whitish hair. Length 3.6—4 mm.

Ormond, Fla., April 2—6. "New Smyrna, Enterprise and Biscayne Bay, Fla., on palmetto blossoms." (*Schwarz.*)

XVII. Microcholus Lec., 1876.

Broadly oval, robust species having the beak as long as thorax, curved, cylindrical, not striate; antennæ inserted two-fifths from apex, first joint of funicle as long as the next three or four, sec-

ond slender, longer than third; thorax strongly narrowed in front, constricted but not tubulate near apex, its flanks concave so as to cause the lateral edge to appear well defined, the base truncate; elytra not wider than thorax, distinctly narrowed behind, their disc very convex; tarsal claws small, divergent.

KEY TO SPECIES OF MICROCHOLUS.

a. Beak minutely and sparsely punctate, its apex flattened; scutellum rather large, elongate-oval; upper surface nearly glabrous.
591. STRIATUS.

aa. Beak distinctly punctate, not flattened at tip; scutellum minute, triangular; upper surface rather densely but unevenly scaly.
592. PUNCTICOLLIS.

591 (8912). MICROCHOLUS STRIATUS Lec., 1876, 304.

Broadly oblong-oval, convex. Black, thorax polished, elytra feebly alutaceous; legs reddish-brown; thorax with a small cluster of large white scales each side of base and a few before scutellum; elytra with widely scattered similar scales and a small group at base of third interval; under surface sparsely, the legs, sides of meso- and metasterna and last three ventral segments more densely, clothed with similar scales. Thorax one-third wider than long, sides broadly curved from base to the feebly constricted apex; disc very finely, shallowly and very sparsely punctate. Elytra about as long as wide; striæ rather fine, deep, not punctate; intervals wide, each with a single row of very fine, distant punctures. Tarsal claws short, very stout. Length 4.5 mm.

Lakehurst, N. J., Apr. 26. Punta Gorda, Fla., Nov. 16. Heretofore known only from the single type taken at Lake Harney, Fla., May 4.

592 (8913). MICROCHOLUS PUNCTICOLLIS Lec., 1876, 304.

Body and antennæ black, shining; legs reddish-brown; under surface, legs and elytra covered rather densely with large, oval white scales, a little closer on third and fifth intervals toward base; thorax more sparsely clothed with elongate scales, except a wide stripe on sides, which is more densely scaly. Thorax two-thirds wider than long, sides broadly rounded, the apex scarcely one-half as wide as base; disc rather finely punctured, more densely on sides and with a broad, smooth median line. Elytra not quite as wide at base, and twice as long as thorax; striæ fine, in some places indistinct, remotely punctate; intervals broad, sparsely, finely and irregularly punctate. Length 3.4—3.8 mm.

Taken in numbers by Hubbard & Schwarz at Lake Ashley, Enterprise and Baldwin, Fla., on marshy meadows; June 10. As the thorax is wider than elytra and the latter very convex and strongly narrowed behind, the insect has a striking and peculiar appearance.

XVIII. Nicentrus Casey, 1892. (Anagram of Centrinus.)

Small, rather narrow, oblong-oval or subcylindrical, convex species, having the beak generally thick, rather short; antennæ inserted about its middle in female, slightly beyond in male; mandibles with inner edge straight, finely toothed; front coxæ narrowly separated; prosternum unarmed in male.

KEY TO EASTERN SPECIES OF NICENTRUS.

a. Prosternum flat or nearly so; length less than 4 mm.
b. Front coxæ separated by less than half their own width; beak rather stout, not tapering, never longer than head and thorax; second joint of funicle not longer than the next two united.
c. Scales of thorax abruptly denser and conspicuous at sides.
d. Punctures of thorax contiguous and more or less coalescent lengthwise; scales of elytra in a single even row on each interval. 593. LINEICOLLIS.
dd. Punctures of thorax rather widely separated; scales on third and fifth intervals of elytra broadly confused. 594. INGENUUS.
cc. Scales of thorax evenly distributed, but slightly more dense at sides.
e. Larger, 2.8—3.7 mm.; punctures and scales of inner elytral intervals confused. 595. DECIPIENS.
ee. Smaller, not over 2.2 mm.; intervals each with a single row of punctures and scales. 596. EFFETUS.
bb. Front coxæ separated by more than half their width; beak one-half the length of body, more slender and almost impunctate; second joint of funicle as long as the next three. 597. CONTRACTUS.
aa. Prosternum with a narrow and deep but scaly longitudinal groove; beak very stout, especially toward base in male; larger, 3.7—5 mm.
f. Black or piceous, legs paler; surface rather densely clothed with grayish scales. 598. CANUS.
ff. Reddish-brown throughout; surface almost glabrous. 599. NEGLECTUS.

593 (8933). Nicentrus lineicollis Boh., Schön., 1844, 221.

Narrowly oblong, subparallel, convex. Black, rather dull; antennæ, tibiæ and tarsi dark reddish-brown; thorax with slender whitish scales, arranged transversely near the sides and along a narrow median line; those of elytra disposed in a nearly even single line along each interval; scales beneath broadly oval and dense, except towards the sides of thorax. Beak as long as thorax, its sides striate and sparsely punctured. Thorax slightly longer than wide, sides parallel from base to middle, then converging to apex; disc finely and densely punctate, feebly constricted near apex. Elytra slightly wider at base than thorax, sides parallel to apical fourth, then broadly rounded to apex; striæ deep, finely punctate; intervals coarsely, rugosely punctate, each puncture bearing a scale. Length 2.5—3.2 mm.

Frequent throughout Indiana, more so in the northern counties; swept from Jersey-tea, *Ceanothus americanus* L.; June 24—Aug. 8. Locally throughout New Jersey, occasionally common. Ranges from New England to Illinois, south to South Carolina and Texas.

594 (11,173). NICENTRUS INGENUUS Casey, 1892, 610.

Oblong-oval, black and somewhat shining throughout, the legs with a feeble rufo-piceous tinge; vestiture consisting of pale yellowish scales, broad and dense beneath, elongate and narrower on the elytra, where they are arranged in one or two rows on the intervals, the lines of the third and fifth wider; on the thorax they are small and dark, except in lateral fifth or sixth, where they become yellowish and conspicuous. Beak not quite as long as head and thorax, abruptly bent near base, strongly curved near apex. Thorax one-third wider than long, sides broadly and feebly curved from base nearly to apex; disc with deep, rather large punctures, and a narrow smooth median line. Elytra slightly wider and about four-fifths longer than thorax; striæ coarse, deep; intervals closely, rather coarsely and confusedly punctured. Length 3.8—4 mm.

Described from Illinois, Iowa and Texas.

595 (8932). NICENTRUS DECIPIENS Lec., 1876, 313.

Oblong-oval, convex. Black, shining, legs reddish-brown; thorax with white, sparse, slender scales, somewhat broader and denser towards the sides; those of elytra large, elongate-oval, unevenly arranged in one or two rows on the inner intervals, in single rows on the outer ones; under surface densely clothed with oval pale scales. Beak evenly curved, as long as thorax, male, slightly longer and more slender, female, sides densely, rugosely punctured. Thorax slightly wider than long, sides feebly curved from base to apical third, then broadly rounded and converging to apex; disc densely, rather coarsely punctate. Elytra slightly wider and four-fifths longer than thorax, deeply striate; intervals finely and subrugosely punctate. Length 2.8—3.7 mm.

Haw Creek, Fla., June 10. Recorded also from Cedar Keys, Fla., southwestern Pennsylvania, Kansas and Texas. Resembles *Centrinus picumnus* but more slender and parallel.

596 (11,175). NICENTRUS EFFETUS Casey, 1892, 613.

Allied to *decipiens*. Differs by characters given in key and by having elytra twice as long as thorax, the scales in single even rows on the intervals; punctures of thorax small and distinctly separated; front coxæ more widely separated. Length 2.2 mm.

Described from a single female from Haw Creek, Fla.

597 (11,176). NICENTRUS CONTRACTUS Casey, 1892, 613.

Differs from the two preceding in its shorter and broader body, longer polished and almost impunctate beak, longer second funicular joint and more widely distant front coxæ. The white scales are very fine, sparse and uniformly distributed over the thorax, broader, denser and widely confused on all the elytral intervals, and very broad and dense beneath. Elytral intervals all deeply, densely and confusedly punctate. Length 3.2 mm.

Also described from a single Florida female.

598 (8939). NICENTRUS CANUS Lec., 1876, 421.

Elongate-oblong, convex. Black, feebly shining; beak, antennæ and elytra reddish-piceous; legs paler reddish-brown; upper surface clothed with oblong whitish scales, moderately densely and evenly distributed, those beneath much broader and very dense. Beak as long as head and thorax, antennæ inserted at middle, female; shorter, antennæ inserted at apical two-fifths, male; stout, cylindrical, striate, coarsely and sparsely punctate on sides, more finely above. Second joint of funicle as long as the next two. Thorax convex, one-third wider than long, sides feebly curved from base to beyond middle, then strongly rounded to apex; disc strongly convex, rather finely and closely punctate and with a narrow, smooth dorsal line. Elytra feebly flattened, slightly wider at humeri than thorax, sides feebly converging; striæ fine, deep; intervals flat, finely, rugosely punctate. Length 3.7—5 mm.

St. Augustine, Enterprise and Haw Creek, Fla.; Tybee Beach, Ga., June 26. Taken by Townsend (1903, 98) on *Abutilon holosericium* Scheele at Santo Tomas, Texas, June 6.

599 (——). NICENTRUS NEGLECTUS sp. nov.

Elongate-oval, robust. Nearly uniform reddish-brown, shining, abdomen tinged with fuscous; above almost glabrous; flanks of thorax and middle of abdomen rather thickly clothed with large, oblong, silvery white scales. Beak of male rather stout, as long as thorax, striate and densely punctate on sides, finely and sparsely punctate above. Second joint of funicle nearly as long as the next three. Thorax as long as wide, sides almost straight from base to apical fourth, then slightly rounded to the feebly constricted apex; disc with fine, dense subconfluent punctures which merge to form minute strigæ on sides and flanks; median smooth line very narrow, incomplete. Elytra scarcely wider at base than thorax, sides nearly parallel to apical fourth, apex broadly rounded; striæ fine, indistinctly punctate; intervals flat, each with two rows of confused shallow punctures. Under surface finely and densely punctate. Length 4.2 mm. (*W. S. B.*)

Long Boat Key, Sarasota, Fla., Aug. 14; Leng collection. More slender than *canus*, the thorax longer and less convex, the color and vestiture widely different.

XIX. Centrinites Casey, 1892. (Gr., Centrinus + "like.")

Small, rhomboid-oval species having the mandibles deeply notched within near apex; beak as long as head and thorax, its dorsal surface polished and subcarinate, with an even row of small punctures each side of the smooth raised line; antennæ inserted beyond its middle, the scape reaching three-fourths to eye, basal joint of funicle as long as the next three, second one-half longer than third, the outer joints finely pubescent like the club; elytra at humeri distinctly wider than thorax, their sides strongly converging to the narrowly rounded apex; prosternum impressed along the middle, very narrowly separating the coxæ.

600 (11,178). Centrinites strigicollis Casey, 1892, 616.

Rhomboid-oval. Black or dark reddish-brown, shining; tibiæ, tarsi and antennæ more or less piceous; above thinly clothed with elongate, slender white and piceous scales, the former condensed along the sides and on the basal lobe of thorax and also on elytral intervals two, near base and towards apex, four and six broadly, and three, five and seven in single sparse lines which are less distinct towards base and apex; under surface rather sparsely clothed with white scales. Beak with sides flattened, densely and rugosely punctate. Thorax two-thirds wider than long, sides feebly converging from base to apical third, then strongly rounded to the constriction; disc strigose and with finely carinate median line. Elytral intervals flat, twice as wide as striæ, the first, third, fifth and seventh with a single row of punctures, the others confusedly punctate. Length 3.5 mm.

Frankfort, Ky., June 9. Known from Hot Springs, N. C., Ohio and Missouri. Taken by Robertson on the bunch-flower, *Melanthium virginicum* L. and as a pollen feeder on *Trillium sessile* L. (*Pierce.*)

XX. Oömorphidius Casey, 1892. (Gr., "egg" + "form.")

Distinguishable by an oval, extremely convex and subglabrous body; rather long, moderately stout, curved beak; strongly tubulate thorax; rather robust legs, the femora somewhat curved.

601 (8914). Oömorphidius lævicollis Lec., 1876, 304.

Oval, convex, strongly narrowed behind. Dark reddish-piceous, shining, minutely alutaceous; elytra black, legs reddish-brown; above very sparsely clothed with linear white scales. Beak stout, as long as head and thorax, finely and sparsely punctured. Thorax short, twice as wide as long, very convex, strongly narrowed in front, sides feebly curved, very strongly constricted about one-fourth from apex, the constriction forming a deep, narrow groove extending completely across the dorsal surface; base broadly rounded; disc very finely and sparsely punctate, its lateral edge nearly acutely defined. Elytra not narrower

at base than thorax, sides beyond middle strongly narrowed and slightly rounded to apex; striæ very fine, represented by widely distant, elongate, shallow punctures, and ending near the base in deep foveæ which are narrowed behind; intervals broad, flat, smooth. Length 2.2—3.2 mm.

Bainbridge, Ga., July 15—27. Leng collection. Known elsewhere from St. Louis, Mo., District of Columbia and Crescent City, Fla. Rare wherever found.

XXI. LIMNOBARIS Bedel, 1888. (Gr., "decorated" + Baris.)

Small elongate-oblong or narrowly oval, usually subdepressed species having the mandibles short, stout, strongly curved, feebly notched at apex, broadly crossed when closed; humeral callus feebly developed; thorax often very finely alutaceous, rarely densely punctate; surface subglabrous except in *longula*. Casey recognized 25 species, 17 of which occur in the Eastern United States. For convenience they are separated into two groups.

KEY TO GROUPS OF EASTERN LIMNOBARIS.

a. Antennal club large, the basal joint making up more than half its mass; beak rather stout, the antennæ inserted beyond its middle in male, near middle in female; prosternum always widely separating the coxæ, never armed in the male; body usually piceous or reddish-brown in color. GROUP A.

aa. Antennal club smaller and narrower, the basal joint comprising less than half its mass; prosternum often armed in male; body intense black except in *grisea*. GROUP B.

GROUP A.

Belonging to this group are six of our eastern species, separated as follows:

KEY TO SPECIES OF GROUP A.

a. Thorax bordered at the sides with an abruptly defined stripe of pale scales.

b. Pale stripe of thorax conspicuous, composed of very large, broad scales.

c. Thorax wider than long, its disc with a large, oval smooth spot each side; form more robust, rather broadly oval or subrhomboidal. 602. BRACATA.

cc. Thorax almost as long as wide, its disc without smooth spot each side; form elongate-oval. 603. LIMBIFER.

bb. Pale thoracic stripe faint, composed of small, narrow and remotely distant scales; intervals concave, only slightly wider than striæ; form much narrower and more depressed. 604. TABIDA.

aa. Thorax without a distinct submarginal pale stripe, the scales, however, often more distinct on sides than on middle of disc.

d. Elytral striæ coarse, always more than one-half the width of intervals, the latter concave, their punctures coarse; form de-

pressed; thorax parallel, nearly as long as wide, its sides rounded and narrowed in front. 605. DEPLANATA.

dd. Elytral striæ fine, the intervals more finely punctate.

e. Body dark reddish-brown throughout; punctures of thorax fine, very remote, unevenly distributed and irregular in size. 606. DENUDATA.

ee. Black, strongly shining, legs and antennæ piceous; punctures much closer and more evenly distributed. 607. OBLITA.

602 (11,182). LIMNOBARIS BRACATA Casey, 1892, 627.

Rather broadly oval, convex. Dark reddish-brown to piceous, shining; head piceous; thorax with a wide curved submarginal stripe each side, and a small patch in front of scutellum of large, elongate-oval whitish scales; elytra with a row of similar scales along the third interval and forming a small spot at base of fifth; punctures of legs and under surface each bearing a smaller whitish scale. Antennæ inserted two-fifths from tip of beak, first joint of funicle subclavate, more than twice as long as second. Thorax one-half wider than long, sides feebly curved from base to beyond middle, then broadly rounded and distinctly constricted near apex; disc with a wide median line and a large oval space each side near middle devoid of punctures, elsewhere rather coarsely, not densely punctate, substrigosely so near apical angles. Elytral striæ wide, deep, faintly punctate; intervals each with a single row of rather large, close-set punctures. Flanks of thorax distinctly strigose; remainder of under surface coarsely and rather sparsely punctate. Male with middle of first and second ventral segments broadly and deeply concave, the cavity thickly clothed with brownish hairs. Length 2.7—3.1 mm.

Lake and Marion counties, Ind., rare; June 8—27. New Jersey; Leng collection. Known elsewhere only from District of Columbia, Ohio, Iowa and Missouri. Both specimens at hand are reddish-brown, not piceous-black as described by Casey. *Oligolochus robustus* Linell (1897, 53), described from New Jersey and District of Columbia, is a synonym.

603 (11,183). LIMNOBARIS LIMBIFER Casey, 1892, 628.

Elongate-oval, moderately convex. Piceous-black, antennæ, beak and legs reddish-brown; scales large, broad, nearly white, very unevenly placed, being condensed along the marginal region of thorax and scattered along intervals of elytra in nearly single lines, with a more distinct spot at base of third interval. Beak cylindrical, rather stout, as long as head and thorax, feebly flattened toward apex and with sparse elongate punctures on sides near base. Disc of thorax very coarsely punctate and with a wide median smooth line, the punctures deep, separated by their own diameters. Elytra slightly wider and three-fourths longer than thorax; striæ coarse, deep; intervals one-half wider than grooves, each with a single row of small, rather distant punctures. Front coxæ separated by nearly their own width. Length 3.6 mm.

Known only from Florida and District of Columbia.

604 (11,185). LIMNOBARIS TABIDA Casey, 1892, 629.

Elongate-oblong, subparallel, rather strongly depressed. Piceous-black, shining, legs and antennæ dull reddish-brown; sides of thorax rather thickly clothed with minute yellowish, inclined hair-like scales, which form a faint broad submarginal band; elytral intervals each with a single row of similar whitish scales. Beak stout, as long as thorax, feebly curved, striate and coarsely punctate on sides; antennæ inserted at apical third, first joint of funicle as long as the next three, second one-half longer than third. Thorax about as long as wide; sides feebly and broadly curved from base to apical fourth, then rounded and strongly converging to apex; disc finely, unevenly and rather densely punctate, the punctures tending to coalesce lengthwise and form faint strigæ on the sides; median smooth line narrow, often visible only behind the middle. Elytra scarcely wider than thorax, the sides subparallel to middle, then feebly converging to the rounded apex; striæ wide, deep; intervals but little wider than the striæ, each with a single row of coarse, deep, close-set punctures. Length 2.5—3 mm.

Marshall, Vigo, Knox and Perry counties, Ind., scarce: Jan. 6—August 8; one on the former date beneath bottom rail of fence in moist ground. Known heretofore only from the type described from Illinois. The abruptly defined submarginal thoracic stripe of yellowish setæ or scales is visible distinctly only under a strong lens by artificial light.

605 (11,186). LIMNOBARIS DEPLANATA Casey, 1892, 630.

Oblong, subdepressed. Black, feebly shining, subglabrous; beak, antennae and tarsi piceous. Beak rather slender, cylindrical, as long as thorax, coarsely and rather densely punctate on sides near base, more finely and sparsely above. Thorax almost as long as wide, sides subparallel from base to middle, then broadly and evenly curved to apex; disc rather coarsely, deeply and somewhat unevenly punctate, the median smooth line distinct. Elytra slightly wider and three-fourths longer than thorax; striæ deep, rather coarse; intervals one-half wider than grooves, concave, each with a single row of rather coarse, deep, not close-set punctures. Under surface coarsely and densely, the abdomen more finely and sparsely, punctate. Length 3—3.5 mm.

Lake County, Ind., rare; May 30. Philipp, Miss, May 14. Known heretofore only from Keokuk, Iowa. Larger and broader than *tabida*, the setæ minute, scarcely visible above.

606 (11,187). LIMNOBARIS DENUDATA Casey, 1892, 632.

Narrowly oval, subdepressed. Dark reddish-brown throughout, shining; very sparsely clothed on sides of thorax, near apex of elytra and that of abdomen, with very small yellowish scale-like hairs. Beak not quite as long as thorax, rather coarsely and densely marked with linear punctures on sides of basal third, elsewhere finely and sparsely punctate. Thorax

slightly wider than long, disc with a broad, median smooth line, finely unevenly and very sparsely punctate. Elytra at base as wide as thorax, striæ coarse, rather shallow; intervals nearly twice as wide as striæ, each with a single row of punctures which vary much in size. Length 3.3 mm.

Described from Florida without definite locality.

607 (11,189). LIMNOBARIS OBLITA Casey, 1892, 634.

Elongate-oval, moderately convex. Black, shining, subglabrous; legs and antennæ piceous; elytra minutely alutaceous. Beak slender, about as long as head and thorax, its punctures fine, linear, rather sparse. Thorax slightly wider than long, disc distinctly constricted at an unusual distance behind the apex, rather coarsely, deeply and closely punctate; a median line on basal two-thirds and a wide apical margin devoid of punctures. Elytra distinctly wider and nearly twice as long as thorax; sides parallel from base to apical third, then converging to tips; striæ deep, abrupt, rather coarse; intervals somewhat concave, one-half or more wider than grooves, each with a row of small, close-set, uneven punctures. Length 3.5 mm.

Known only from the Wisconsin type.

GROUP B.

Those of our eastern species, 11 in number, belonging to this group, are separated as follows:

KEY TO SPECIES OF GROUP B.

a. Piceous-black, the elytra and legs reddish-brown, the former blackish along the suture; surface densely but unevenly clothed throughout with elongate-oval, yellowish-white scales. 608. GRISEA.

aa. Black; surface subglabrous except in *longula*.

b. Second joint of funicle shorter than the next two; prosternum generally with a horn or process before the coxæ in the male; smaller, not over 3.5 mm.

c. Form more or less oblong-oval; beak very slender, swollen above at base, its transverse constriction distinct.

d. Elytral intervals with punctures confused; beak in both sexes shorter than thorax; surface feebly shining, alutaceous. 609. CONFUSA.

dd. Elytral intervals each with a single row of punctures.

e. Punctures of intervals fine, remote.

f. Elytral setæ very minute and inconspicuous.

g. Prosternum of male with a horn or cusp in front of the coxæ; beak of male three-fourths as long as thorax.

h. Male with a long acute horn before each coxa and a large, round, very deep, median excavation of prosternum; second joint of funicle one-half longer than third. 610. PUTEIFER.

hh. Male with a short obtuse horn before each coxa, the

prosternum feebly and broadly impressed, with a small pit just behind its front margin; second joint of funicle scarcely longer than third. 611. CONFINIS.

gg. Prosternum of male unarmed before the coxæ, but with a short obtuse ridge extending in front of each coxal cavity; antennal club narrow, elongate-oval, as long as the five preceding joints united. 612. CONCURRENS.

ff. Elytral setæ long, white, conspicuous; prosternum of male unarmed. 613. CONCINNA.

ee. Punctures of intervals strong, deep, close-set; elytral setæ minute, inconspicuous. 614. FRATERCULA.

cc. Form narrowed, linear; beak not swollen above at base, not longer than thorax in female; male with a slender horn before each coxa which extends forward beyond the front margin of prosternum, the latter with a deep pit at middle. 615. PROLIXA.

bb. Second joint of funicle as long or longer than the next two; prosternum of male unarmed; beak thicker, without basal transverse impression, the latter represented by a frontal fovea; larger, usually 4 or more mm.

i. Upper surface clothed rather sparsely but conspicuously with slender white scales; thorax evenly narrowed from base to apex, the latter feebly constricted, not subtubulate. 616. LONGULA.

ii. Upper surface subglabrous; apex of thorax obviously subtubulate.

j. Punctures of third elytral interval only confused; beak nearly straight.

k. Elytra black; intervals rather coarsely rugosely punctate; form larger and broader; length 4—5 mm. 617. RECTIROSTRIS.

kk. Elytra piceous; intervals very finely and shallowly punctate; form narrow, subparallel; length 3.2 mm. 618. TENUA.

jj. Punctures of all elytral intervals confused, rugose; beak distinctly curved at middle; length 5.2 mm. 619. CALVA.

608 (8931). LIMNOBARIS GRISEA Lec., 1876, 312.

Oblong-oval, robust, feebly convex. Color given in key. Scales of thorax arranged transversely, more elongate and denser on the sides; those of elytra more oval, unevenly disposed in strongly marked lines along the intervals, the line of the third interval especially wide. Beak rather stout, cylindrical, as long as head and thorax, female, not longer than thorax, male, punctured and striate. Thorax one-half wider than long, sides parallel from base to beyond middle, then strongly rounded and converging to apex; disc coarsely and densely punctate. Elytra slightly wider and twice as long as thorax, feebly narrowed from the humeri: striæ fine, deep; intervals each with an irregular double row of punctures, each puncture bearing a white scale. Length 3.4—3.7 mm.

Originally collected by Belfrage in Texas; since recorded from New Jersey, District of Columbia and Arizona.

609 (8942). Limnobaris confusa Boh., Schön., 1836, 740.

Oblong-oval, subdepressed. Black, antennæ slightly paler; subglabrous, the hair-like scales very small, fine, white, sparsely disposed above and beneath. Beak finely and densely punctured near base, more sparsely toward apex. Thorax slightly wider than long, its punctures rather dense, not contiguous, the median smooth line distinct. Elytra slightly wider and three-fourths longer than thorax; striæ fine, deep; intervals flat, wide, mostly with two rows of coarse, shallow confused punctures. Prosternum of male with a long slender, oblique horn before each coxa; in front of them a large, deep excavation. Length 2.7—3.5 mm.

Starke and Jackson counties, Ind., rare; June 19—Aug. 25. Hopatcong and Orange Mts., N. J. Ormond, Sanford, Dunedin, Sarasota and Ft. Myers, Fla., frequent in marshy meadows; Feb. 27—Oct. 22. Ranges from New England to Colorado, south to North Carolina and southern Florida.

Specimens from Ormond and Ft. Myers, Fla., agree with those mentioned by LeConte (1876, 317) in having the thorax more coarsely, less densely punctured, fifth ventral as long as third and fourth united, and processes of male very short, acute cusps. They may be known as var. *brevicuspa*. (*W. S. B.*)

610 (11,192). Limnobaris puteifer Casey, 1892, 639.

Oblong-oval, moderately convex. Black, shining and subglabrous throughout. Beak of male stout, cylindrical, feebly curved, finely carinate above, roughly and rather coarsely punctate; of female slightly longer, much more slender, nearly straight, finely and sparsely punctate. Thorax one-fourth wider than long, sides feebly curved from the base and distinctly constricted near apex; disc minutely alutaceous, finely and sparsely punctate, with median smooth line distinct on basal half and a small, irregular smooth space midway between it and margin. Scutellum oblong, notched at apex. Elytra oblong, nearly one-third wider and more than twice as long as thorax, sides parallel to apical third; striæ fine; intervals wide, flat, each with a single row of very fine, scabrous, scarcely impressed punctures. Length 3—3.2 mm.

Parke, Dubois and Floyd counties, Ind., scarce; May 13—June 23. Described from "Indiana?" Recorded from Ohio by Dury. "Extremely like *confinis*, but the ante-coxal processes are much more developed, elytra wider and longer, second joint of funicle longer, and prosternum of male with deep excavation." (*Casey.*) In one of the two males at hand the antecoxal horns extend to base of beak; in the other they are two-thirds as long. The fifth ventral in both sexes has a large rounded impression at middle, this distinctly deeper in male. The minute whitish scales are condensed at the base of the first four elytral intervals, where they are more evident than elsewhere.

611 (8944). LIMNOBARIS CONFINIS Lec., 1876, 317.

Form of *puteifer* but smaller and somewhat narrower. Black, shining, alutaceous, subglabrous; antennæ and tarsi piceous. Beak as in *puteifer*. Thorax narrower than there, but slightly wider than long, its punctures shallower and more sparse, the median smooth line entire. Elytra one-fifth wider than thorax, sides parallel to apical fourth; punctures of intervals still finer, less impressed and much more distant one from another. Length 2.3—2.9 mm.

Kosciusko, Hamilton and Martin counties, Ind., scarce; May 16—Oct. 24. Swept from grasses in marshes. Montclair, N. J., Batavia, N. Y.; June 3—July 13. Ranges from New York to Michigan and Iowa, south to Texas.

612 (11,193). LIMNOBARIS CONCURRENS Casey, 1892, 640.

Oblong-oval, convex. Black, shining, the minute, hair-like scales very sparse above and beneath, forming single rows on the elytra. Beak of male as long as thorax, rather slender, cylindrical, coarsely and densely punctate on sides; of female as long as head and thorax, more slender, less curved and with antennæ at, instead of in front of middle. Thorax but slightly wider than long, disc alutaceous, finely and sparsely punctate, the median smooth line narrow, entire. Elytra nearly one-third wider and twice as long as thorax, the punctures of intervals fine and rather distant. Length 2.2—3.2 mm.

Originally described from numerous specimens from the District of Columbia. Recorded elsewhere only from Ohio. "Allied to *confinis*, but with much longer beak and narrower antennal club." (*Casey.*)

613 (8941). LIMNOBARIS CONCINNA Lec., 1876, 316.

Oblong, subparallel, convex. Black, shining, faintly bronzed; above and beneath clothed with long, sparse, narrow white scales, those on the elytral intervals, arranged in single lines. Beak four-fifths as long as thorax, feebly curved; thicker, striate and more roughly punctured in male. Joints 2—7 of funicle equal in length; club oval, robust, as long as the preceding six joints. Thorax slightly wider than long, narrowed and feebly constricted in front, disc minutely alutaceous, rather coarsely punctate, the punctures separated by their own diameters. Elytra equal in width to and three-fourths longer than thorax, sides parallel, rounded behind in apical fourth; striæ very fine, intervals wide, minutely punctate. Prosternum of male with two small foveæ near apex. Length 1.8—2.5 mm.

Described from New York, Florida and Texas. Recorded from South Jersey, N. J. Frequent at Sanford, Dunedin and Ft. Myers, Fla., in swampy meadows; on huckleberry blossoms in spring; Jan. 29—Dec. 3. Probably occurs throughout Florida. The two northern records were probably based on wrong determinations.

614 (11,194). Limnobaris fratercula Casey, 1892, 642.

Oval, feebly convex. Black, shining, subglabrous. Beak rather stout, shining, as long as thorax, feebly curved near apical third, punctured at sides near base. Thorax slightly wider than long, sides broadly curved from the base, not constricted near apex; disc not coarsely, rather sparsely punctate, the median smooth line distinct. Elytra elongate-oval, slightly wider at base and twice as long as thorax; striæ fine, coarser and feebly crenulate toward base; intervals each with a single row of punctures. Prosternum of male with a small pit behind the apical margin. Length 2.5 mm.

Described from Florida. "Differs from *confusa* in its small size, uniseriate elytral intervals, simple male prosternum and slightly longer beak; from *confinis* by broader, more depressed form, coarser elytral striæ and larger, closer serial punctures." (*Casey.*)

615 (8943). Limnobaris prolixa Lec., 1876, 317.

Slender, parallel, subcylindrical, convex. Black, feebly bronzed, shining, subglabrous, the hair-like scales very minute but longer and more visible toward the sides of thorax; antennæ and tarsi reddish-brown. Beak slender, cylindrical, feebly curved, as long as thorax, densely punctate, male; much smoother, female; antennæ inserted at middle, male, far behind, female. Second joint of funicle one-half longer than third. Thorax slightly wider than long, sides feebly curved, subapical constriction distinct; disc alutaceous, very finely and sparsely punctate. Elytra slightly wider and nearly three times as long as thorax, sides parallel, obtusely rounded in apical fourth; striæ deep, very fine; intervals wide, each with a row of minute, very distant punctures. Length 2.3—4 mm.

Beverly, Mass, May 23. Ranges from New England to Michigan and Colorado, south to Ohio. Harrington (1891, 26) states that the adults occur on sedges and aquatic plants. In one of the males at hand the antecoxal horns extend forward nearly to the middle of beak, their tips diverging in order not to interfere with the lateral movements of the beak.

616 (8940). Limnobaris longula Lec., 1876, 316.

Elongate-oval, convex. Black, shining, tarsi and antennæ reddish-brown; the slender, hair-like white scales almost evenly distributed above and beneath. Beak of female about as long as head and thorax, slender, curved, densely punctate near base, elsewhere almost smooth, polished; of male, rather thick, shorter than thorax, deeply and densely striate-punctate. Thorax one-fourth wider than long, sides parallel near base, then broadly, feebly curved to near apex; disc rather coarsely, not densely punctate and with a faint, narrow, smooth median line. Elytra scarcely wider than thorax; striæ rather fine, the edges subcrenulate; intervals finely, sparsely, unevenly punctured and transversely rugulose; prosternum of male strongly impressed along the middle. Length 4—4.3 mm.

Described from Texas; occurs also in Florida.

617 (8937). LIMNOBARIS RECTIROSTRIS Lec., 1876, 315.

Elongate-oval, convex. Black, feebly shining, finely alutaceous; antennæ and tarsi dark reddish-brown. Beak of male as long as thorax, thick, compressed, carinate above, striate and densely punctate on sides; of female slender, cylindrical, longer than thorax, very finely and sparsely punctate. Thorax slightly wider than long; sides subparallel from base to middle, then converging and strongly constricted; punctures of disc rather fine, somewhat sparsely and unevenly distributed, the median smooth line distinct, narrow. Elytra slightly wider and more than twice as long as thorax, sides parallel to apical fourth; striæ fine, deep; intervals wide, their punctures fine, distinctly rugulose, somewhat transverse, those of the third confused, each puncture bearing a short yellowish seta. Under surface coarsely and densely, the middle of abdomen much more finely and sparsely, punctate. Length 4—5 mm.

Steuben, Kosciusko and Spencer counties, Ind., scarce; probably throughout the State; May 24—July 4. Taken by sweeping marshy meadows. Hopatcong, South Orange and Newark, N. J.: July. Ottawa, Canada, June 14—August 13. Ranges from New England and Canada to Michigan and Iowa, south to South Carolina. Harrington (1891, 25) states that it occurs in wet places on the club-rush or wool-grass, *Scirpus cyperinus* L., in the stems of which the larvæ live. On *Nuphar advena* in June. (*Hamilton.*) Varies much in size, the smaller, narrower forms approaching *prolixa*.

618 (——). LIMNOBARIS TENUA sp. nov.

Elongate, subparallel. Piceous, finely alutaceous, feebly shining; head, beak and thorax black. Beak of male as long as thorax, striate, finely and densely punctate on sides, carinate above. Antennæ inserted at middle, second joint of funicle slender, as long as the next two. Thorax convex, as long as wide, sides straight to apical third, then rounded and feebly constricted; punctures of disc fine, sparse, ocellate, unevenly distributed; median smooth line very narrow. Elytra but slightly wider and more than twice as long as thorax, sides parallel to apical fourth; striæ very fine, impunctate. Length 3.2 mm. (*W. S. B.*)

Kosciusko Co., Ind., rare; June 3. Resembles *prolixa* in form, but second joint of funicle longer and male without antecoxal processes.

619 (8936). LIMNOBARIS CALVA Lec., 1876, 314.

Elongate-oblong, convex. Black, moderately shining, the very small, slender scales sparse above, more distinct beneath. Beak as long as thorax, stout, striate, densely punctate; of female more slender, less deeply sculptured. Thorax scarcely wider than long, sides nearly straight and parallel from base to middle, then strongly rounded and tubularly constricted near

apex; disc rather densely and deeply, not coarsely punctate, with narrow median smooth line. Punctures of elytral intervals coarse, confused, rugose. Male with a small, elongate-oval, feeble impression near base of abdomen. Length 5.2 mm.

Long Island, N. Y., July. Described from Georgia and Florida. Recorded also from Pennsylvania, District of Columbia and Ohio. Occurs on Cratægus in July. (*Hamilton.*)

XXII Oligolochus Casey, 1892. (Gr., "small" + "similar.")

Small, oval, convex species resembling *Microcholus* but having the mandibles small, thick, strongly curved, notched at apex and broadly crossed when closed; prosternum flat, not impressed, nor excavated in front but with a fine, deep, transverse constriction; front coxæ separated by less than half their own width; pygidium slightly exposed at tip in male.

620 (8949). Oligolochus convexus Lec., 1876, 422.

Oval, convex. Black, shining, legs reddish-brown; very sparsely clothed with elongate white scales, condensed toward sides and on median line of thorax and toward base of third and fifth intervals of elytra. Beak slender, feebly curved, as long as thorax, coarsely, sparsely, unevenly punctate on sides, smoother toward tip. Antennæ inserted in front of middle, scape almost reaching the eye, second joint of funicle scarcely longer than third. Thorax one-third wider than long, sides broadly curved from base to apex, which is distinctly constricted but not tubulate; disc coarsely, not densely punctate, the smooth median line entire. Elytra slightly wider at base and three-fourths longer than thorax; striæ coarse, deep, not punctate; intervals each with an uneven single row of small, close-set punctures, somewhat confused on third. Length 2.4 mm.

Known only from Tampa and Enterprise, Fla., and District of Columbia. *O. robustus* Linell (1897, 53) is a synonym of *Centrinus bracata* Casey.

XXIII. Idiostethus Casey, 1892. (Gr., "peculiar" + "chest.")

Small oval or elongate-oval species having the antennæ inserted at or beyond the middle, second joint of funicle as long as the next two, club usually small; prosternum broadly impressed, not narrowly sulcate, noticeably tumid, especially before the coxæ, which are never separated by more than one-third their width; thorax tubulate at apex, its disc more or less wrinkled or strigose, the median basal lobe prominent; vestiture consisting of small, slender setæ and scales which, while very sparse, are distinct, especially towards the sides of the body beneath. The four known species occur with us.

KEY TO SPECIES OF IDIOSTETHUS.

a. Elytra without scattered white scales; antennal scape more abruptly club-shaped.

b. Met-episterna and sides of abdomen not densely scaly; club smaller, its basal joint composing about one-half its mass.

c. Smooth median line of thorax distinct; sculpture coarse; males often with an acute tubercle or spine before the front coxæ. 621. TUBULATUS.

cc. Thorax without smooth median line; sculpture much finer; males without tubercle or spine. 622. SUBCALVUS.

bb. Met-episterna and sides of abdomen very densely clothed with oval, over-lapping white scales; club larger, its basal joint constituting only one-third its mass. 623. ELLIPSOIDEUS.

aa. Elytra with widely scattered slender white scales; antennal scape gradually clavate; smooth line of thorax entire. 624. DISPERSUS.

621 (8910). IDIOSTETHUS TUBULATUS Say, 1831, 20; ibid, I, 285.

Oval, rather robust. Black, shining, antennæ, tibiæ and tarsi dark reddish-brown. Beak slender, strongly curved, about one-half longer than thorax, striate, densely and finely punctate. Thorax two-thirds wider than long, sides feebly converging from base to apical third, then broadly rounded to the strongly constricted apex; disc with punctures coarse, deep, rather dense, more or less confluent lengthwise. Scutellum small, widely notched at apex. Elytra one-fourth wider at base and twice as long as thorax; striæ coarse, deep, strongly punctate; intervals narrow, feebly concave, each with a row of rather coarse shallow punctures bearing very short white hairs. Prosternum of male usually unarmed, but often (var. *strigapunctus* Hamilton 1893, 309), with an acute tubercle or short curved spine in front of each coxa. Length 2.8—3.7 mm.

Clark, Posey and Perry counties, Ind., scarce; April 22—May 6. Hopatcong, Fort Lee and Orange Mts., N. J. Ranges from New York to Wisconsin south to Florida. Occurs on *Crataegus;* also found in flowers of orchids in June, and in the small purple-fringed orchis, *Blephariglottis psychodes* L., in July. (*Harrington.*)

Although Casey in his table to genera of Barini (1892, 468), states that "the prosternum is never armed in the male" in those genera following *Limnobaris*, yet in two of the males of *I. tubulatus* at hand there is an acute curved spine in front of each coxa, while two others bear acute tubercles in the same place. Hamilton, in his description of *strigapunctus* says: "The male has an acute tubercle before the anterior coxæ; in one example a spine as in some *Centrinus.*"

622 (8948). IDIOSTETHUS SUBCALVUS Lec., 1878, 622.

Oval, convex. Black, shining, very thinly clothed with short, grayish, semiprostrate hairs; antennæ, tibiæ and tarsi more or less reddish-brown. Beak about as long as head and thorax, feebly curved, finely and densely

punctate; antennæ inserted at its middle, second joint of funicle slender, three-fourths as long as first. Thorax small, conical, one-half wider than long, very finely, densely punctate, the punctures merging to form fine strigæ; the median line often finely subcarinate, not smooth. Elytra distinctly wider at humeri than thorax, sides subparallel from humeri to middle, then strongly converging; striæ fine, deep; intervals each with a single row of small, shallow punctures, each bearing a minute seta. Prosternum strongly impressed along the middle, under surface coarsely and densely punctate. Length 1.8—2.5 mm.

Common throughout the southern two-thirds of Indiana, not taken in the northern counties; Apr. 17—June 15. Sometimes abundant on the flowers of *Phacelia bipinnatifida* Michx., and other April- and May-blooming plants. "In great numbers in the flowers of the water-leaf, *Hydrophyllum appendiculatum*, in May." (*Dury.*) Ranges from Pennsylvania to Michigan, south to Kentucky and Missouri.

623 (11,197). IDIOSTETHUS ELLIPSOIDEUS Casey, 1892, 652.

Elliptic, ovoidal, convex. Black, shining, antennæ, tibiæ and tarsi dark reddish-brown; above sparsely clothed with very small, inclined scale-like hairs. Beak slender, curved, as long as head and thorax, densely rugosely punctate on sides, male; one-fourth longer, much more finely punctate, female. First joint of funicle as long as the next four. Thorax at base one-half wider than long, sides feebly converging to apical fourth, then rounded and constricted near apex; disc rather finely and densely punctate, finely strigose on sides and with a very narrow median smooth line. Elytra one-fourth wider at base than thorax, striæ fine, deep; intervals slightly concave, their punctures coarse, shallow, close-set, more or less confused toward base. Length 2.8—3.5 mm.

Known from Illinois, Iowa and Missouri. Easily distinguished by the hemi-elliptical outline of elytra, large antennal club and dense vestiture of sides of abdomen.

624 (11,198). IDIOSTETHUS DISPERSUS Casey, 1892, 652.

Oval, rather robust, convex. Black, shining, legs rufo-piceous; vestiture sparse and uneven, consisting of minute setæ on the thorax which become long, slender, recumbent whitish scales on the lateral fifth and in the middle before the scutellum; elytra with a single row of very small setæ on each interval, with long, slender scales very widely scattered over the entire surface. Beak of male as long as thorax, its sides densely punctate and scaly. Thorax three-fourths wider than long, sides feebly converging from base to apical fourth, then strongly rounded to the constriction; disc unevenly sculptured, strigose near center, densely punctate on sides, finely and sparsely punctate near basal angles. Elytra one-fifth wider, and more than twice as long as thorax; striæ very coarse, deep; intervals flat, each with a row of close-set, rounded punctures. Length 3.3 mm.

Known only from Alabama.

XXIV. Stethobaris Lec., 1876. (Gr., "breast" + Baris.)

Oval, robust, convex species having the surface black, shining, subglabrous; beak strongly curved, usually tapering from base to apex; antennal club very large, nearly as long as the entire funicle; prosternum deeply, abruptly and broadly excavated; humeri prominent, situated distinctly behind the base of elytra; tarsal claws small, slender, free, feebly diverging.

KEY TO EASTERN SPECIES OF STETHOBARIS.

a. Sides of thorax broadly curved, the punctures of disc rather fine, widely separated; those on sides beneath coarse, not strigose. 625. CORPULENTA.

aa. Thorax smaller and more conical, its sides converging from the base; the punctures larger and less sparse.

b. Sides of thorax beneath obliquely and finely strigose; disc with a narrow, entire median smooth line; punctures of elytral intervals in part confused.

c. Striæ of elytra strongly punctate, their edges crenulate. 626. INCOMPTA.

cc. Striæ finely punctate at bottom, their edges not crenulate. 627. COMMIXTA.

bb. Sides of thorax distinctly punctate, not strigose beneath; disc with interrupted median smooth line; punctures of intervals very fine and in a single row. 628. OVATA.

625 (8911). Stethobaris corpulenta Lec., 1876, 420.

Broadly oval. Black, glabrous, strongly shining; antennæ and legs piceous. Beak stout, cylindrical, polished, as long as thorax, finely and sparsely punctate. Thorax short, very convex, four-fifths wider than long, strongly tubulate at apex, punctured as given in key, the median smooth line entire. Elytra behind humeri one-fifth wider than thorax, striæ coarse, deep, their sides crenulate on basal half; punctures of intervals very fine, sparse, and confused. Beneath coarsely, the abdomen more finely, punctate; third and fourth ventrals with a single transverse row of punctures. Length 3.3—3.5 mm.

Bassenger, Fla., Feb. 28; rare Taken at Tampa and Lake Ashley by Schwarz. Recorded also from Michigan and District of Columbia, but these records probably based on specimens of *incompta*.

626 (11,199). Stethobaris incompta Casey, 1892, 655.

Oval, convex. Black, strongly shining. Beak strongly curved, as long as head and thorax, densely punctured on the sides. Thorax two-thirds wider than long, disc rather finely, deeply, not densely punctate. Intervals of elytra differing greatly in width, the third twice as wide as the grooves,

the fourth scarcely wider than the latter, the narrow ones with single, the others with confused rows of minute distant punctures. Length 3.1 mm.

Lake County, Ind., June 4. Known heretofore only from the single female type which Col. Casey says was labelled "Fla." "Differs from *corpulenta* in the less obese form and larger antennal club, smaller, more conical more coarsely punctate thorax, with the punctures forming long ruga at sides beneath." (*Casey.*)

627 (——). Stethobaris commixta sp. nov.

Broadly oval, convex. Black, glabrous, shining, finely alutaceous; antennæ and legs piceous. Beak strongly curved, as long as head and thorax, finely and rather sparsely punctate. Antennæ inserted just behind its middle, first joint of funicle robust, as long as the next three, second slightly longer than third, 3—7 gradually slightly wider; club elongate-oval, nearly as long as funicle. Thorax two-thirds wider than long, sides feebly converging from base to apical third, then broadly rounded and strongly constricted; disc finely, rather sparsely and unevenly punctate and with a narrow smooth median line. Elytra oval, distinctly wider behind the humeri than base of thorax, the striæ rather wide, deep, remotely punctate; intervals twice as wide as grooves, flat, minutely, sparsely and confusedly punctate. Length 2.5—2.8 mm. (*W. S. B.*)

Steuben Co., Ind., May 27. Tyngsboro, Mass.; Blanchard collection. Known also from Michigan, Ohio and District of Columbia. "Bred from coral-root (*Corallorhiza*) collected at Balsam, N. C., in July." (*Dury.*) This is the *Stethobaris ovata* Casey nec LeConte.

628 (11,200). Stethobaris ovata Lec., 1868, 363.

Suboval, rather robust, convex. Black, glabrous, shining; legs slightly piceous; antennæ and tarsi reddish-brown. Beak rather stout, moderately curved, as long as thorax, male, one-fourth longer, female, striate and deeply punctate on sides, more finely and sparsely above. Thorax subconical, at base two-thirds wider than long, sides rapidly converging to the strong apical constriction; disc finely, deeply and rather sparsely punctate. Elytra at humeri one-fifth wider than thorax, then distinctly narrowed to the rounded apex; striæ coarse, deep, distinctly remotely punctate, their sides feebly crenulate; intervals one-half wider than grooves, male, twice as wide, female. Prosternum deeply excavated in front of coxæ. Length 2.8—3 mm.

Tyngsboro, Mass., July. "Middle, southern and western states." (*LeConte.*) Known also from Ottawa, Canada, New York and Missouri. LeConte, after describing (1868, 363) a form under the name *Baridius oratus*, decided (1876, 303) that it was a synonym of Say's *tubulatus*, the identity of which was somewhat in doubt, and stated that he preferred to suppress the

name *oratus* "until some other insect occurs better suited to Say's description." Casey (1892), without remarks on the subject, transferred and described Say's species under the genus *Idiostethus*, described what he thought was LeConte's species under the name *Stethobaris orata*, and described as new the true *ovata* under the name *S. congermana*. A study of LeConte's type of *Baridius oratus* at Cambridge shows its thorax to be nonstrigose beneath, its dorsal line faint and interrupted and the elytra to be "deeply striate, striæ punctured and interspaces narrow, each with a row of fine but distinct punctures," exactly as described by LeConte (1876, 303.) Casey's *S. congermana* is, therefore a synonym of *S. ovata* Lec.

XXV. Zaglyptus Lec., 1876.

Very small, oval, strongly sculptured species, bearing long, stiff erect yellowish hairs; beak slightly longer than head and thorax, evenly feebly curved, the antennæ inserted just beyond its middle; prosternum broadly and feebly impressed along the middle; thorax with base strongly sinuate and deeply margined, the apex tubulate; elytra wider than thorax, gradually narrowed behind from the rather prominent humeri; first and second ventral segments very large, closely united. The genus and two species were characterized by LeConte, who placed them in the tribe Cryptorhynchini, from which they were removed to their present position by Casey. They are the smallest known members of the Barini.

KEY TO SPECIES OF ZAGLYPTUS.

a. Elytra with coarsely punctured shallow striæ, the intervals rather wide. 629. STRIATUS.

aa. Elytra deeply sulcate, the grooves punctured; intervals narrow; color darker. 630. SULCATUS.

629 (8751). Zaglyptus striatus Lec., 1876, 237.

Oval, convex. Dark reddish-brown, shining, upper surface with a few long, slender, yellowish prostrate hairs at base of thorax, in addition to the long, stiff setæ. Beak rather slender, striate, punctate toward base. Thorax conical, one-half wider than long, disc very coarsely, not densely, punctate. Elytra oval, one-fourth wider at base than thorax; intervals twice as wide as the strial punctures, each with a row of long, yellowish, erect hairs, arising from minute punctures. Length 1.4 mm.

Known from Pennsylvania, District of Columbia and Ohio. Both it and the next occur in dead branches, especially those of young oak lying on the ground. (*Schwarz.*)

630 (8750). Zaglyptus sulcatus Lec., 1876, 237.

Oval, convex. Dark reddish-brown, the thorax, and apical half of elytra often piceous. Head and tubular constriction of thorax smooth. Beak deeply sulcate each side, minutely punctate. Thorax conical, two-thirds wider than long, very coarsely and densely punctate behind the apical constriction. Elytra strongly convex, rapidly narrowed from the very prominent humeri; intervals narrow, convex, each with a row of distant small punctures, from which proceed long, erect hairs. Under surface very coarsely and sparsely punctate. Length, 1.6 mm.

Perry County, Ind., rare; May 20. Recorded from Mobile, Ala., District of Columbia and Ohio. Stated by Dury to be abundant near Cincinnati.

XXVI. Zygobaris Lec., 1876. (Gr., "yoke" + Baris.)

Small rhomboidal, subtropical species having the beak very long, slender, strongly curved; mandibles small, thick, curved, notched at apex, strongly crossed when closed; antennæ inserted behind the middle in both sexes; elytral striæ coarsely punctate; tarsal claws connate at base.

631 (8946). Zygobaris nitens Lec., 1876, 318.

Robust, subrhomboidal. Black, shining, thinly sprinkled with small white hair-like scales. Beak two-thirds as long as body, female, slightly longer than head and thorax, male, slender, curved, not thicker at base, densely punctured at the sides on basal half. Thorax conical, three-fifths wider than long, sides feebly curved, constricted near apex, disc very coarsely, not densely, punctured. Elytra at base much wider than thorax, striæ fine, deep, marked with large, distant punctures; intervals nearly flat, each with a row of equally large but more distant punctures. Under surface very coarsely punctured. Length 2.6—3.7 mm.

Key West and other points in southern Florida. An allied species breeds in the berries of *Xanthoxylum* in Texas.

XXVII. Zygobarinus Pierce, 1907.

This genus was founded (1907-a, 385) for the following species, placed in *Zygobaris* by its author, but differing widely from the two species now included in that genus.

632 (——). Zygobarinus cœlestinus Linell, 1897, 55.

Robust, subrhomboidal, convex, glabrous. Dark blue, opaque, strongly alutaceous; antennæ and tarsi reddish-brown. Beak sparsely punctate, basal half bluish-green, apical half piceous; short, curved, cylindrical, slightly flattened at apex. Thorax conical, scarcely wider than long, sides feebly rounded, disc sparsely and finely punctate, more coarsely at sides. Elytral striæ linear, distinctly impressed, with remote, fine punctures; intervals flat, each with a single row of small, distant, submuricate punctures. Length 4 mm.

Cocoanut Grove, Florida, April 25. A unique and handsome species.

XXVIII. CATAPASTUS Casey, 1892. (Gr., "strewn" or "scattered.")

Very small, robust, oval or subrhomboidal species, having the beak short, stout, broad, usually flattened toward apex, densely and finely punctate throughout; antennæ inserted beyond its middle, the scape nearly reaching the eye, joints 2—7 of funicle short, subequal; mandibles as in *Zygobaris;* scutellum small, usually densely scaly; prosternum with a broad, deep impression along its middle, this narrower and deeper toward apex; tarsal claws small, connate in basal third.

KEY TO SPECIES OF CATAPASTUS.

a. Scutellum glabrous, with a small white spot each side; upper surface sparsely clothed with scattered white scales. 633. ALBONOTATUS.

aa. Scutellum densely scaly; surface above densely clothed with small brown scales, and larger white or yellowish ones.

b. Scales of upper surface forming a definite pattern, viz., a broad brown band along the middle of thorax and a W-shaped pale mark across the suture of elytra at middle. 634. SIGNATIPENNIS.

bb. Scales of upper surface not arranged as above, the white ones of elytra widely scattered.

c. Legs blackish; antennæ piceous, the club abruptly much paler; thorax but slightly wider than long. 635. CONSPERSUS.

cc. Legs and antennæ pale reddish-brown throughout; thorax one-half wider than long; scattered white scales of elytra larger and broader. 636. DIFFUSUS.

633 (——). CATAPASTUS ALBONOTATUS Linell, 1897, 56.

Rhomboidal, convex. Piceous black, tarsi reddish-brown; very sparsely clothed with scattered white scales, which are very narrow and small on the ventral surface, larger on thorax and elytra, where they are collected into small spots on the base of the second interval and on the base of the thorax opposite the humeral umbone. Beak thick, coarsely striate-punctate, not flattened at apex, strongly curved and abruptly bent at middle. Thorax as long as wide, sides slightly rounded, feebly constricted at apex; disc rather coarsely punctate, the punctures separated by their own diameters. Elytral striæ narrow, remotely and finely punctate; intervals each with a row of small distant punctures and fine transverse strigæ, the white scales mostly on the third, seventh and ninth intervals. Length 1.7 mm.

Lake Worth and Key West, Florida.

634 (——). CATAPASTUS SIGNATIPENNIS Linell, 1897, 55.

Robust, rhomboidal, convex. Black, somewhat shining, antennæ and legs piceous. Thorax densely covered with rounded scales, forming a broad brown band along the middle and a yellowish white one on the sides, with a denuded spot each side of the basal lobe; elytra sparsely clothed with

narrow brown scales and broader yellowish ones, the latter forming a spot at the base of third interval and a large W-shaped mark across the suture at middle. Beak as long as thorax, strongly curved. Thorax wider than long, conical, distinctly constricted at apex, coarsely and densely punctate. Elytra distinctly wider than thorax, sides broadly rounded, feebly convergent; intervals broad, flat, with sparse, confused, subrugose punctures. Length 2 mm.

Key West, Florida.

635 (8947). CATAPASTUS CONSPERSUS Lec., 1876, 318.

Narrowly subrhomboidal, convex. Black, feebly shining, club of antennæ pale yellow; above rather densely clothed with narrow, dark reddish-brown scales, with larger white ones somewhat densely placed on sides of thorax and remotely scattered over the elytra; under surface rather thickly clothed with similar whitish scales. Beak cylindrical, curved, not longer than thorax, scaly, finely and densely punctured. Thorax gradually narrowed in front, sides nearly straight, slightly rounded and feebly constricted near tip; disc rather coarsely, deeply and densely punctate, the base bisinuate. Elytra behind the base distinctly wider than thorax, humeri obliquely rounded; striæ rather coarse, deep; intervals flat, finely, densely and confusedly punctured. Length 1.7—2.3 mm.

Kosciusko Co., Ind., scarce; June 1—June 3. Edgebrook, Ill., Sept. 15. Recorded from Michigan, Ohio, Illinois and Iowa. Near Cincinnati, Ohio, occurring by hundreds on prickly ash (*Xanthoxylum*), May 5. (*Dury.*)

636 (11,205). CATAPASTUS DIFFUSUS Casey, 1892, 666.

Rhomboid-oval, convex. Black, legs and antennæ pale reddish-brown; surface clothed above and beneath as in *conspersus*, the white scales not condensed on sides of thorax, those of elytra larger and broader. Beak and antennæ as in *conspersus*. Thorax conical, the sides feebly and evenly curved, distinctly constricted near apex; disc coarsely, very densely punctate with traces of a narrow median smooth line. Elytra wider and more than twice as long as thorax; intervals flat, twice as wide as striæ, finely, closely and rugosely punctate, the punctures confused. Abdomen closely punctured, the middle of third and fourth ventrals glabrous. Length 2.2 mm.

Dunedin, Fla., rare; Oct. 23. Described from southern Florida. Slightly larger, darker and more robust than *conspersus*.

XXIX. BARINUS Casey, 1886. (Gr., Baris + "like.")

Rather large, elongate-oval or parallel species having the beak short, thick, curved; head large in proportion to size of thorax; antennæ inserted beyond middle of beak, their grooves rapidly oblique; prosternum deeply and narrowly impressed or

sulcate; scutellum small, glabrous or nearly so; body always unevenly and more or less densely scaly; tarsal claws connate for at least half their length.

KEY TO EASTERN SPECIES OF BARINUS.

a. Body glabrous above but with two wide, abruptly limited stripes of large, pale, densely placed scales; form elongate-oval. 637. BIVITTATUS.

aa. Body unevenly scaly above.

b. Scales of upper surface forming lines on the elytral intervals.

c. Elytral punctures fine; sixth interval with a broad, dense line of scales, abruptly terminating at basal fourth; white scales of second interval not extending beyond apical fifth. 638. CRIBRICOLLIS.

cc. Elytral punctures coarse and dense; sixth interval with a line of large white scales extending fully to middle, then with narrower, sparser and darker scales, nearly to apex; second interval broadly clothed with large white scales from base to apex. 639. SQUAMOLINEATUS.

bb. Scales of elytra not lineate in arrangement, but more or less denuded.

d. Body more broadly oval; front coxæ separated by nearly one-half their own width. 640. CURTICOLLIS.

dd. Body narrow and linear.

e. Scales of thorax broadly and abruptly dense towards the sides, the median glabrous area about one-third the whole width. 641. ALBESCENS.

ee. Scales of thorax sparse and nearly evenly distributed, not at all condensed on sides. 642. LINEARIS.

637 (8955). BARINUS BIVITTATUS Lec., 1878, 431.

Elongate-oval, convex. Black, shining, with a faint violaceous lustre; legs dark reddish-brown; vestiture above very minute except a broad stripe each side, extending from apical margin of thorax to elytral apex, of large, broad, densely placed yellowish-white scales; sterna beneath and margins of abdomen similarly clothed. Beak stout, cylindrical, three-fourths as long as thorax, coarsely punctured toward base. Thorax slightly wider than long; sides near apex rounded and broadly and feebly constricted; disc coarsely, not densely punctate, the smooth median line narrow, entire. Elytra as wide and twice as long as thorax; striæ fine, deep, not punctate; intervals flat, their punctures very fine, sparse and confused. Tarsi very broad, the hind ones as long as the tibiæ, scaly above, densely pilose beneath. Length 5—5.3 mm.

"Northern Forida." Punta Gorda and Haw Creek, Fla. St. Catherine Island, Ga. Occurs on *Sagittaria*. (*Schwarz.*)

638 (8953). BARINUS CRIBRICOLLIS Lec., 1876, 422.

Elongate-oval, convex. Black, shining; legs slightly piceous; thorax with a stripe each side composed of large white, densely placed scales; pale scales of second and sixth elytral intervals as described in key, also arranged on third interval for a short distance behind the middle, and on fourth

near base, and from basal to apical fourth; under surface with conspicuous white scales in a small spot near front coxæ, on the sterna and toward sides of abdomen. Beak short, thick, not more than two-thirds as long as thorax, punctured on sides near base. First joint of funicle as long as the rest united. Thorax as long as wide, its disc coarsely, deeply, not densely punctate, the smooth line distinct on basal two-thirds. Elytra distinctly wider and twice as long as thorax; intervals unequal in width, finely and somewhat confusedly punctate. Length 3.6—3.8 mm.

Jacksonville, St. Augustine and Enterprise, Fla. Recorded also from Michigan and Ohio.

639 (11,206). BARINUS SQUAMOLINEATUS Casey, 1886, 256.

Elongate, subparallel, convex. Black, shining; antennæ and legs dark reddish-brown; upper surface in great part clothed with large white closely placed scales, arranged transversely on sides of thorax, and obliquely on the median intervals of elytra, the sides and suture of the latter and middle of thorax almost bare; beneath densely scaly along the sides. Beak stout, very strongly curved, two-thirds as long as thorax, finely and densely punctate near base, nearly smooth toward apex. Thorax subcylindrical, not wider than long; sides straight and parallel to apical fifth, then feebly constricted; disc rather densely and evenly punctate. Elytra at humeri slightly wider than thorax, then feebly converging to the narrowly rounded apex; striæ fine, deep, remotely punctate; intervals each with a row of rather coarse, close-set punctures. Length 3.1—3.7 mm.

Lake County, Ind., rare; May 30. Known elsewhere only from Illinois and Iowa. Differs from *cribricollis* in its less robust and strongly curved beak, smaller punctures and much broader and more dense lateral stripe of thorax, and in the much coarser, deeper and denser punctures of elytral intervals. Breeds in the roots of a rush. (*Pierce*, 1916.)

640 (11,209). BARINUS CURTICOLLIS Casey, 1892, 673.

Narrowly oblong-oval, convex. Polished black, legs dark rufo-piceous; vestiture of yellowish, elongate-oval scales arranged densely along the lateral third of thorax and uniformly distributed but not dense on elytra; beneath denser at sides of last three ventral segments. Beak as in the preceding, coarsely but sparsely punctate. Thorax short, two-fifths wider than long, sides parallel and straight to apical third, then rounded and converging to apex; disc coarsely, rather sparsely punctate, the punctures round, deep, perforate and isolated, the median smooth line narrow. Elytra slightly wider and two and a half times as long as thorax; striæ deep; intervals coarsely, confusedly, not densely punctate. Front coxæ separated by about one-half their width. Length 2.7—3 mm.

Recorded from District of Columbia, Missouri and Louisiana.

641 (8952). BARINUS ALBESCENS Lec., 1880, 218.

Elongate, subparallel, convex. Black, shining with a very faint violaceous lustre, legs red; above clothed with yellowish-white scales, round and dense towards the sides of thorax, elongate-oval and evenly distributed

on the elytra except in an apical and two submarginal spots on each which are bare and shining; scales of middle of thorax and under surface very small and sparse. Beak stout, curved, three-fourths as long as thorax, naked, cylindrical, punctured near base. Basal joint of funicle as long as the next five; club large, pale. Thorax slightly longer than wide, finely and sparsely punctate, the median smooth line distinct. Elytra not wider at base than thorax; striæ fine, deep; intervals flat, smooth. Length 2.5—2.7 mm.

Westville, N. J.; one specimen, July 2. Columbus, Texas. Breeds in the stems of *Cyperus virens*. (*Pierce.*)

642 (8952). BARINUS LINEARIS Lec., 1876, 422.

Form of *albescens*. Black, alutaceous; above sparsely and evenly clothed with small dirty white obovate scales, sparser along sides of elytra, especially toward base and in a small discal spot near apex. Beak much shorter than thorax, glabrous, punctate, very thick near base. Thorax not quite as long as wide, deeply, densely, not coarsely punctate, the median smooth line entire. Elytra slightly wider at base and more than twice as long as thorax, parallel, narrowed in apical third, obtusely rounded at apex; intervals flat, finely, confusedly and rather distantly punctate. Length 3.7 mm.

Known only from Sumter Co., Florida.

XXX. BARILEPTON, Lec., 1876. (Gr., Baris + "slender.")

Very slender, elongate species having the beak thick, curved, not longer than thorax, strongly compressed; head large, convex, its under surface usually transversely excavated; antennal grooves deep, beginning in front of middle near upper margin and obliquely descending; first joint of funicle elongate, 2–7 nearly equal; prosternum broadly impressed, narrowly separating the coxæ; middle and hind tarsi longer than the tibiæ, their second and third joints dilated; tarsal claw single, simple, moderately stout. Two of the four known species occur with us. They are said to be semi-aquatic in habits.

KEY TO EASTERN SPECIES OF BARILEPTON.

a. Elytra at humeri not wider than base of thorax, the latter constricted near apex; beak almost evenly curved. 643. FILIFORME.

aa. Elytra at humeri wider than base of thorax; thorax less elongate, suddenly narrowed and constricted near apex. 644. QUADRICOLLE.

643 (8951). BARILEPTON FILIFORME Lec., 1876, 319.

Elongate, subcylindrical, convex. Black, shining, legs brownish; upper surface clothed with small yellowish-white scales, more condensed along the sides. Beak naked, shining, punctured, shorter than thorax. Head thinly

pubescent, finely punctate. Thorax about as long as wide, rather densely, not coarsely punctured, the scales lying transversely. Elytral striæ fine; intervals flat, alutaceous. Length 2.5—2.9 mm.

Kosciusko County, Ind., scarce; June 24—25. Taken by sweeping marshy meadows. Masonville, N. J.; June 16. Ranges from New England to Michigan and Nebraska, south to District of Columbia and Virginia.

644 (8954). Barilepton quadricolle Lec., 1876, 423.

Form of *filiforme* but stouter. Black, shining, densely clothed with pale scales narrow on thorax, broad and denser on elytra, moderately dense on the abdomen; antennæ and legs dark reddish-brown. Beak stout, as long as thorax, punctured and scaly near the base. Thorax slightly wider than long, widest at apical third; sides parallel from base to beyond middle, then strongly rounded and constricted to apex; disc rather coarsely, unevenly, not densely punctate, with a very narrow smooth median line. Elytra at humeral umbones obviously wider than thorax; striæ fine, deep; intervals flat, coarsely, confusedly punctate. Length 3.1—3.3 mm.

Wells County, Ind., rare; June 1. West Hoboken, N. J.; one specimen. Known elsewhere only from Michigan, southern Illinois and Nebraska. Differs from *filiforme* by its larger size, more robust outline, elytra wider than thorax and longer beak.

XXXI. Eunyssobia Casey, 1892. (Gr., "spiny" + "life.")

This generic name replaces *Euchætes* Lec., which was preoccupied. To it belongs a very singular insect having the beak extremely slender, cylindrical, strongly curved, abruptly inflated behind the antennæ; mandibles very short, thick, compressed, bent upward and moving in a nearly vertical plane as in *Balaninus*, the condyles being received in broad, deep fissures at the sides of the buccal opening beneath, thus affording a broad base for the attachment of muscles and forming a most effective boring apparatus; antennæ inserted beneath the beak, near basal third, their grooves inferior, confluent behind, scape reaching the eyes, first and second joints of funicle subequal in length, 3—7 much shorter; tarsi long, slender, the third joint not wider than second, claws simple, divergent.

645 (8956). Eunyssobia echidna Lec., 1876, 320.

Oval, feebly convex, narrowed before and behind. Dark brown, densely covered with a crust of pale, dark brown and whitish scales, intermixed above with long, stiff, erect bristles, the pale brown scales covering the thorax and base of beak, the whitish ones forming large patches at base and smaller ones near apex of elytra and densely covering the legs and under

surface. Beak three-fourths as long as body, female, shorter, male, its outer two-thirds shining brown, very finely and sparsely punctate. Thorax much wider than long, strongly constricted and tubulate at apex; disc very uneven, a large circular impression each side near base. Elytra at base distinctly wider than thorax, sides converging from basal third to apex; sculpture hidden by scales. Length 2.6—3.2 mm.

Marion Co., Ind., March 24; one specimen at sap on maple stump. Probably occurs throughout the southern half of State. LeConte's type was from Illinois. "Ohio, Kentucky and Iowa, apparently not rare and said to depredate upon hickory." (*Casey.*) "This curious little porcupine beetle was in clusters on trunk of a dead beech tree, near Cincinnati, Sept. 27, 1900. I took one cluster of 30; they very closely resemble the color of the bark." (*Dury.*)

XXXII. Plocamus Lec., 1876. (Gr., "complicated.")

Allied to *Eunyssobia* but has the beak shorter, not abruptly inflated, but gradually stouter near base; mandibles as in that genus; funicle of antennæ shorter, the second joint but slightly longer than third; bristles of upper surface sparse and much shorter.

646 (8957). Plocamus hispidulus Lec., 1876, 320.

Oblong-oval, moderately convex. Black, antennæ and legs reddish-brown; surface densely clothed with large, grayish-brown and whitish scales the pale ones covering the under surface and scutellum and forming a few spots on elytra; the latter with a transverse piceous spot just behind the middle. Beak as long as head and thorax, feebly curved, shining and sparsely punctate beyond the middle, scaly near base. Thorax short, as wide as long, sides feebly curved, constricted near apex; disc somewhat uneven, very densely and rather coarsely punctate. Elytra one-fourth wider and more than twice as long as thorax; striæ distinct, rather deep; intervals slightly convex. Length 1.8—2.2 mm.

Not yet recognized from, but should occur in, southern Indiana. New Brunswick, Lakehurst and Atco, N. J., July 4—Aug. 21. Known from District of Columbia, Maryland, Ohio and Kentucky. Breeds in the dead branches of black locust infested with *Agrilus* larvæ. (*Schwarz.*)

The following species of Barini described from the Eastern United States have not been recently recognized:

Baridius confertus Boh., Schön., 1836, 728. Florida.

Centrinus pistor Germ., Schön., 1836, 170. Kentucky.

Centrinus dilectus Harris, 1836, 80. Halsey's collection, No. 105, locality not recorded. "Possibly a large female of *C. salebrosus*." (*Casey.*)

Tribe XIX. ZYGOPINI.

Small species of a peculiar facies principally distinguished by their large eyes which are nearly contiguous above and not covered in repose. In form they are either short, squat and subrhomboidal or more elongate and subcylindrical. They have the beak long, slender, feebly curved, and in repose usually lying in a deep prosternal groove; first and second ventrals long, the others usually much shorter; abdomen rarely horizontal as in most other Curculios, but sloping strongly and obliquely upward; pygidium of our eastern genera completely concealed by the elytra; legs slender, front coxæ elongate and prolonged to a point on the inner side; claws simple, divergent.

The name of the tribe is from the Greek zygops, meaning "joined" = "eyes". The adults, like certain Buprestids, often rest motionless on the bark of felled or decaying trees. They abound in the forest regions of tropical America and warmer parts of the old world but none occur in Europe. About 30 species, distributed among seven genera, are known from the United States. They have been treated in recent years by

Heller, K. M.—"Zygopiden Studien II," 1895.

Casey, T. L.—"Zygopini" *in* Ann. N. Y. Acad. Sci., IX, 1897, 666—678.

Fall, H. C.—"New Species of American Coleoptera of the Tribe Zygopini," *in* Trans. Am. Ent. Soc., XXXII, 1905, 53—61.

Of the 30 species, 11, belonging to five genera, are known from the eastern United States.

KEY TO EASTERN GENERA OF ZYGOPINI.

a. Abdomen rapidly ascending toward the tip; eyes narrowly separated on the front.

b. Femora armed beneath with a small but distinct tooth; mesosternum excavated to receive the tip of beak I GELUS.

bb. Femora unarmed beneath; mesosternum not excavated (except in *Eulechriops*), the beak free at tip.

c. Antennal club well developed, distinctly pubescent; scales of body broadly oval and nonstrigose; larger species, 2—4 mm. in length. II. CYLINDROCOPTURUS.

cc. Antennal club very small, subglabrous; scales elongate and strigose; smaller, less than 2 mm. in length. III. EULECHRIOPS.

aa. Abdomen horizontal throughout; eyes scarcely separated above.

d. Beak free throughout, the prosternal groove subobsolete; femora minutely toothed; size larger, 3—4 mm. IV. ACOPTUS.

dd Beak partially received in a shallow groove; femora not toothed; smaller, less than 2 mm V. PSOMUS.

I. Gelus Casey, 1897. (Without meaning.)

This genus, proposed by Casey for the species usually listed under *Piazurus*, is consolidated with *Lechriops* in the Biologia. It comprises small, robust, subrhomboidal forms having the beak longer than head and thorax, rather shallowly and coarsely punctate; antennæ inserted near its middle, funicle 7-jointed, the seventh joint subrotund, distinctly stouter than the sixth; club slender, cylindrical, its basal joint as long as the next two combined; elytra in our species much wider than thorax, narrowed behind and rather thickly clothed with narrow oblong-oval scales; legs short and stout.

KEY TO EASTERN SPECIES OF GELUS.

a. Thorax about as long as wide.

b. Elytra with a small but conspicuous white sutural spot; second joint of funicle scarcely longer than first; length 2.3—3.1 mm. 647. OCULATUS.

bb. Elytra without sutural white spot; second joint of funicle twice as long as first, equalling in length the four following united; length 5.5 mm. 648. FLORIDANUS.

aa Thorax nearly twice as wide as long; white spot of elytra inconspicuous; length 1.7 mm. 649 SUBFASCIATUS.

647 (8809). Gelus oculatus Say, 1824, 308; ibid., II, 172.

Short, oval, subdepressed above. Black, rather thickly clothed with rusty brown, white and black scales; the white ones condensed to form a small spot each side of thorax and a larger sutural spot behind the middle which, however, extends only to first stria; a few scattered scales across basal margin of elytra and a row of very narrow ones in each stria also white; the black scales form two rounded spots on base of thorax and often a crossbar at its middle, also a few scattered mottlings on sides of elytra; antennæ and tarsi pale reddish-brown. Thorax with sides feebly rounded, disc densely and coarsely punctured, the sculpture hidden by scales. Elytra suddenly one-third wider than thorax, gradually narrowed from base to tips, umbones prominent; striæ narrow, coarsely punctured; intervals wide, flat, coarsely punctured, the sculpture concealed by the scales which are distinctly smaller and narrower than those of thorax. Length 2.3—3.1 mm. (Fig. 98.)

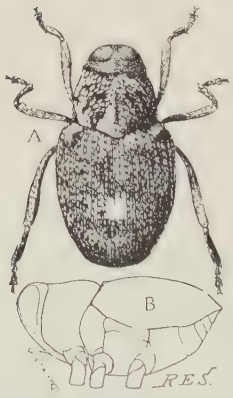


Fig. 98. A, Beetle, × 10; B, outline, side view, showing obliquely ascending abdomen. (Original.)

Frequent throughout Indiana; Apr. 21—Sept. 20. Abundant near New York City, May to September. Dunedin and Lake Istokpoga, Fla.; Feb. 24—April 4; taken especially by beating

foliage along the borders of marshes and hammocks. Ranges from New England to Michigan and Iowa, south to Florida and Guatemala.

648 (——). GELUS FLORIDANUS Fall, 1905, 61.

"Dark brownish castaneous, rather obscurely mottled with white and fulvous scales, which are of broader form than in *oculatus*. Eyes still more narrowly separated than in *oculatus*. Elytral striæ wider, the punctures larger, leaving the intervals narrower, more convex and more irregular. Otherwise nearly as in *oculatus*. Length 5.5 mm.; width 2.2 mm." (*Fall.*)

Key Largo and Elliott's Key, Florida.

649 (8810). GELUS SUBFASCIATUS Lec., 1876, 260.

Rather stout, ovate. Black, above thinly and irregularly clothed with fine white hair-like scales, which form three broad stripes on thorax and three transverse bands on elytra, one basal, surrounding a humeral dark spot, one just behind the middle, the other near apex, the sutural white spot therefore not very conspicuous; beneath thinly clothed with gray scales; antennæ brownish-yellow; hind femora with an indistinct dark band. Beak brown, outer half nearly smooth, base punctured and striate. Thorax gradually narrowed from base, very coarsely and densely punctured. Elytra at base one-third wider than thorax, humeri more rounded and less prominent than in *oculatus;* striæ wide, deep, punctured. Length 1.7 mm.

Described from New York without definite locality. Recorded elsewhere only from Allegheny, Pa., by Hamilton.

II. CYLINDROCOPTURUS Heller, 1895. (cylindrical + Copturus.)

Small robust species, having the elytra only slightly wider than thorax, the form therefore appearing more subcylindrical and less rhomboidal than in *Gelus;* eyes a little more widely separated; club of antennæ proportionately shorter and stouter, its basal joint shorter than the other two combined; beak rather long and slender; antennæ inserted about its middle, the second joint of funicle longer than third; femora not toothed; abdomen with the third, fourth and fifth ventrals subequal in length and strongly ascending. Six species and one variety of the genus are known from east of the Mississippi. They were treated under the generic name *Copturus* Schön. by LeConte in the Rhynchophora of North America, and so listed by Henshaw. Casey in 1897 proposed for them and 12 other forms the genus *Copturodes*, characterizing it only by stating that it "differed from *Copturus* in its less rhombiform body, less unequal first and second funicular joints and completely unarmed femora," and overlooking

the fact that Heller in 1895 had proposed the name under which we here place them.

KEY TO EASTERN SPECIES OF CYLINDROCOPTURUS.

a. Form rather stout, the elytra distinctly less than one-half longer than wide.

b. Body clothed throughout with large overlapping scales, which conceal the entire surface; elytra each with a large dark spot. 650. BINOTATUS.

bb. Scales of body not overlapping; elytra without distinct rounded dark spot.

c. White mottlings of upper surface not very distinct and not arranged to form well defined transverse bands on elytra.

d. Larger, 3.5 or more mm. in length. 651. OPERCULATUS.

dd. Smaller, not over 2.5 mm.

e. Scales of elytra almost uniformly white, the condensed areas, therefore, obscurely defined; thorax finely and densely punctate; form narrow; length 2 mm. 652. FLORIDANUS.

ee. Scales of ground color of elytra dark brown, the condensed areas of white scales therefore more evident; form more robust; length 2.2—2.5 mm. 653. NANULUS.

cc. White mottlings of upper surface very distinct, especially on sides of thorax, and forming two curved interrupted cross-bars on elytra.

f. Scales of median area of thorax narrow or linear; posterior offset of sutural white spot transverse. 654. QUERCUS.

ff. Scales of median area of thorax large and rounded; posterior offset of elytral spot oblique. 654-a. var. FRONTALIS.

aa. Form elongate, more slender; elytra one-half or more longer than wide; base of beak and under surface densely clothed with white scales. 655. LONGULUS.

650 (8817). CYLINDROCOPTURUS BINOTATUS Lec., 1876, 263.

Short, ovate, robust. Dark brown, above densely clothed with grayish-brown scales; elytra each with a large, median, velvety dark brown spot reaching fron second to seventh or eighth intervals; scales of under surface and legs paler; beak dark brown, polished, very finely and sparsely punctate. Thorax as long as wide, feebly narrowed and slightly constricted in front. Elytra at base less than one-fourth wider than thorax, their sculpture hidden by scales. Length 2.3—2.5 mm.

Not yet known from Indiana ,though doubtless occurs in the southern counties. Frequent about New York City in June and July on dry sumac and locust. Ranges from New York west and south to Ohio, Georgia and Texas. Said by Ulke to occur especially on the honey-locust, *Gleditsia triacanthos* L.

651 (8811). CYLINDROCOPTURUS OPERCULATUS Say, 1824, 308; ibid. II, 172.

Elongate-subcylindrical, robust. Black, above thinly clothed with dark gray and white scales, the latter condensed on sides of thorax and forming a few very small oblong spots on elytra; beneath densely clothed with sil-

very gray scales. Beak a little shorter than head and thorax, feebly carinate, sparsely and rather finely punctate. Thorax not longer than wide, sides feebly curved: disc distinctly constricted near apex, coarsely and very densely punctured, each puncture closed by an orbicular scale. Elytra at base about one-fourth wider than thorax, thence feebly curved and converging to the rounded apex, umbones prominent; striæ rather wide, marked with close-set oblong punctures; intervals nearly flat, each with two irregular rows of punctures which are concealed by the narrow oval scales. Length 3.5—4.5 mm.

Lake and Martin counties, Ind., rare; July 7—July 30. Palos Park, Ill., June 22. Ranges from Indiana to Dakota and Colorado, south to Arkansas and Texas. Pierce (1916) states that it breeds in the stems of *Hymenopappus*, pupating in the larval cells in the pith

652 (——). CYLINDROCOPTURUS FLORIDANUS Casey, 1897, 674.

Elongate-oval, convex. Black, above densely clothed with pale brownish and white scales, the former more evident each side of median line of thorax, the white ones densely covering the head, basal parts of beak and the greater part of the elytra, in places forming indistinct lines thereon. Eyes at lower third separated by only about one-fourth their width. Thorax not quite as long as wide, slightly wider at apical third than at base, densely and rather coarsely punctate. Elytra about one-fourth wider and three-fourths longer than thorax, the striæ rather coarsely punctured. Length 2 mm.

Haw Creek, Fla.; taken in numbers by Schwarz. "Allied to *nanulus* but differs in the extremely confused ornamentation, smaller size and narrower form." (*Casey.*)

653 (8812). CYLINDROCOPTURUS NANULUS Lec., 1876, 261.

Elongate-oval, convex. Black, above clothed with dark brown and pale scales, the latter forming three ill-defined stripes on thorax; elytra each with two faint dark clouds, one on the median third, the other near tip, these separated by a pale sutural line and limited by pale bands; head, base of beak and under surface more densely clothed with whitish scales. Thorax slightly wider than long, widest at apical third, disc feebly constricted near apex, densely and rather coarsely punctate. Elytra as in *operculatus*. Length 2—2.5 mm.

Harrison County, Ind., rare; June 11. Enterprise, Fla., June 8. Ranges from Ohio and Iowa to Maryland, Florida and Texas.

654 (8815). CYLINDROCOPTURUS QUERCUS Say, 1831, 20; ibid, I, 286.

Short, suboval, robust. Black, shining; under surface, sides of thorax and base of beak densely clothed with rounded dirty white scales, which also form a spot at middle of base of thorax and a sutural line and two interrupted cross-bars on elytra; antennæ dark reddish-brown. Beak slender,

strongly curved, feebly carinate, finely, shallowly punctate. Thorax slightly wider than long, disc feebly constricted near apex, coarsely and densely punctured. Elytra at base about one-third wider than thorax, sides parallel to behind middle, thence converging to the rounded apex; disc sculptured as in *operculatus*. Length 2.5—3 mm.

Frequent in the southern half of Indiana, May 10—July 24; mating on the former date; not taken north of Hamilton County. Numerous localities near New York City, June 3—August 9. Ranges from New York, Michigan and Iowa south to Maryland and Georgia. Occurs on oak.

654-a (——). CYLINDROCOPTURUS QUERCUS FRONTALIS Casey, 1897, 674.

"Closely allied to *quercus* but differs in its slightly narrower form and in having the scales on the median parts of the pronotum very large and rounded, in *quercus* these scales are narrower and linear." Length 2.6—2.9 mm. (*Casey* Mss.)

Marshall Co., Ind., rare; June 24. District of Columbia. Described from Indiana without definite locality. *C. carifrons* Casey, loc. cit., p. 675, is now regarded by its author as a synonym of *quercus*.

655 (8816). CYLINDROCOPTURUS LONGULUS Lec., 1876, 263.

Elongate, slender, subcylindrical. Black, densely clothed with very small cupreous-brown and white scales, the white ones forming two or three small basal and two lateral spots on thorax and a pattern of white markings on the elytra, the latter usually consisting of an irregular oblique band extending from humerus to middle and a less oblique one behind the middle, the two uniting at the suture, these bands sometimes broken into isolated spots; antennæ pale brownish-yellow; legs banded and mottled with white. Beak rather stout, black, finely and sparsely punctate; second joint of funicle one-half longer than third. Thorax scarcely longer than wide, distinctly constricted near tip, disc finely and densely granulate-punctate. Elytra about one-fourth wider and twice as long as thorax, their sculpture concealed. Length 2.2—2.5 mm.

Tyngsboro, Mass., Apr. 15; Blanchard collection. Recorded from Atco and Egg Harbor, N. J., where it was taken on oak. Ranges from New England to Canada, Utah and California. Schwarz (1894, 15) states that near Washington, D. C., "the larvæ inhabit the galls of *Podapion gallicola*, but they are mere messmates, and their presence is not detrimental to the welfare of the author of the gall." The *subcupreus* of Casey is a synonym, the dark scales of LeConte's type of *longulus* having a strong cupreous tinge and the specimen otherwise fitting Casey's description in nearly every particular.

C. dispersus Casey, 1897, 678, is a variety of *longulus* described from Canada and Kentucky, having the body stouter, the thoracic scales larger and forming a denser and more even crust. The eyes are said to be almost contiguous at or below the lower fourth of front, whereas in *longulus* they are nearest at middle of front.

III. Eulechriops Faust, 1896.
(Gr., "beautiful" + "oblique" + "eye.")

This name has priority over *Zygomicrus* Casey, established for *Copturus minutus* Lec., which differs from the species of *Cylindrocopturus* in the characters given in the generic key; also in its eyes being less separated and in its shorter second funicular joint, which is but slightly if any longer than third.

656 (8819). Eulechriops minutus Lec., J. E., 1824, 171.

Oblong-subcylindrical. Head and usually the thorax blackish, the latter with a stripe each side and a small median basal spot of white scales; beak, antennæ, legs, elytra, and sometimes the thorax, reddish-brown, the elytra with a broad basal band, an oblique band behind middle, a narrow apical margin and an interrupted sutural line, of white scales; under surface and legs thinly clothed with similar scales. Beak as long as thorax, rather stout, curved, finely and sparsely punctate, scaly near base. Thorax subcylindrical, as wide as long, coarsely and densely reticulate-punctate. Elytra but slightly wider at base than thorax, sides parallel to middle, thence feebly converging to apex, striæ fine, rather coarsely punctate; intervals flat, finely rugose. Length 2 mm.

Orange Mts., Jamesburg, Highlands and Anglesea, N. J., July. Jeannette, Pa. Highlands, N. C., June. Occurs mainly on oak; Ranges from New Jersey and western Pennsylvania, south to Georgia

IV. Acoptus Lec., 1876. (Gr., "without" + "cut tail.")

Rather small, subcylindrical species having the beak as long as thorax, cylindrical, curved; antennæ stout, inserted near its middle, club large, the first joint forming two-thirds of its bulk; second joint of funicle shorter than first, equal to third; ventral surface nearly horizontal, its second segment half the length of first, third and fourth shorter, subequal, fifth slightly longer, broadly impressed.

657 (8820). Acoptus suturalis Lec., 1876, 264.

Elongate, subcylindrical. Black, above densely clothed with hair-like gray and blackish-brown scales, the latter covering the center of disc of thorax and forming a broad dark band across the elytra at or just behind their middle; suture from base to middle, and under surface densely clothed

with larger, more oval, silvery-white scales; beak, antennæ and legs reddish-brown. Thorax one-fourth wider than long, sides feebly rounded, disc broadly constricted near apex, densely and coarsely punctate and with an elevated line on its median third. Elytra nearly one-third wider than thorax, broadly impressed on basal third, sides parallel to beyond middle, thence rapidly converging to tips; striæ deep, intervals flat, their sculpture concealed. Length 3.2—4.5 mm.

Fountain Co, Ind., rare; May 12. Bowmanville, Ill., Apr. 7. Frequent near New York City in May and June. Ranges from Canada and New England to Michigan, south to Georgia. Chittenden (1887, 217) states that it lives in the dead wood of beech trees, the adults being found from March 27 to April 20 in company with the larvæ. Occurs also on hop-hornbeam and hickory.

V. Psomus Casey, 1892. (Gr., "a bit or crumb.")

This genus is also represented by a single very small oval, almost glabrous species having the beak as long as head and thorax; antennæ inserted at its basal third, very slender, first joint of funicle longer than the next two, second longer than third, club very small, feebly annulate; ventral segments subequal in length, their sutures straight and deep; tibiæ and tarsi very short, tarsal claws small, divergent, obtusely toothed.

658 (11,076). Psomus politus Casey, 1892, 459.

Short, oval, convex. Black, shining; clothed with a few bristling hair-like scales, especially evident on the scutellum, flanks and base of thorax, and around and between the eyes; antennæ, tibiæ and tarsi pale reddish-brown. Beak smooth, shining, rather coarsely and sparsely punctate. Thorax short, conical, about two-thirds wider than long, sides straight, diverging from apex to base, disc sparsely and finely punctate. Elytra at base nearly one-half wider than thorax, umbones prominent, sides parallel for two-thirds their length, thence rounding to apex; striæ fine, minutely and distantly punctate; intervals subconvex, each with a row of very fine seta-bearing punctures. Length 1.5—1.8 mm.

Described from Indiana without definite locality. Posey County, rare; June 4. One of the two specimens at hand is dark reddish-brown, perhaps from immaturity. Recorded from Quebec, Canada; Hemlock Falls, Jamesburg and Chester, N. J.; July —August. Occurs commonly near Cincinnati, Ohio, on sprouts of the white ash, *Fraxinus americanus* L. June 1—25. (*Dury.*)

Tribe XX. CEUTORHYNCHINI.

This tribe comprises numerous small robust species having the form broadly oval; beak cylindrical, not thickened at base; antennæ elbowed, usually inserted about the middle of beak, their

grooves on the sides and, except in Phytobii, directed against the eyes; funicle 6- or 7-jointed, club oval, pointed, pubescent and annulated; eyes rather large, finely granulated, well separated and, except in Phytobii, more or less concealed in repose; thorax usually wider than long, narrowed in front, its disc usually with characteristic lateral elevations, capped by acute angulations or short spines; scutellum wanting or very small; elytra broadly oval, almost always distinctly wider at base than thorax; pygidium exposed, nearly perpendicular and (except in *Mononychus*) with a transverse elevated line against which the tips of the elytra rest; prosternum grooved for the reception of the beak in repose, the groove sometimes extending backward even to metasternum; first ventral segment longer than second, their suture straight; second ventral prolonged at sides and, in some genera, cutting off the third; fifth ventral longer than either of the two preceding; coxæ all well separated; tarsi slender, the third joint bilobed (except in *Perenthis* and *Phytobius*); claws variable. The males are distinguished by having the beak stouter and less elongate, antennæ less slender and usually inserted nearer the apex, pygidium larger and fifth ventral subtruncate and often foveate.

The scutellum being very minute or invisible, the scutellar space or area is more or less concave and this, taken in connection with the short, broadly oval form and the short, subconical and usually tuberculate thorax, give the members of the tribe an aspect easily recognizable. They are more numerous in northern regions and occur mostly on herbs in low wet places, the larvæ either inhabiting the seeds, seed-stalks or the stems of the plants. Some of the species have been introduced from Europe; and most of the genera are represented in both continents, the tribe being one of holoarctic distribution. The principal paper treating of the species of this country is by

Dietz, Wm. G.—"Revision of the Genera and Species of Ceutorhynchini inhabiting North America," *in* Trans. Amer. Ent. Soc., XXIII, 1896, 387—480.

In it are recognized 102 species, distributed among 18 genera. Of these 66 species belonging to 17 genera, have been recorded as occurring in our territory. For convenience of treatment the genera are grouped into four subtribes, rather feebly distinguished as follows:

KEY TO SUBTRIBES OF CEUTORHYNCHINI.

a. Tarsi with a single claw; upper surface of pygidium of female deeply excavated; larger, 4.5—5 mm. Subtribe I. Mononychi, p. 426.

aa. Tarsi with two claws; pygidium not excavated but carinate in front and with transverse line for reception of tips of elytra; smaller, less than 4 mm.

b. Pectoral groove extending behind the front coxæ into the mesosternum; second ventral segment prolonged at sides, cutting off the third in most of the genera. Subtribe II. Cœliodes, p. 427.

bb. Pectoral groove not extending behind the front coxæ, sometimes wanting; second ventral never prolonged.

c. Beak longer and slender, usually half the length of body; eyes wholly or partially concealed by postocular lobes. Subtribe III. Ceutorhynchi, p. 439.

cc. Beak stout, usually short; postocular lobes wanting (except in genus *Cœlogaster*). Subtribe IV. Phytobii, p. 454.

Subtribe I. Mononychi.

In addition to the characters above given, our single species of this group has the beak long, cylindrical and in repose resting in a deep groove which extends through both pro- and mesosterna into the metasternum; eyes partially hidden by postocular lobes; funicle 7-jointed; second ventral segment as long at middle as third and fourth united; legs slender, tibiæ obliquely fringed at the tip.

I. Mononychus Germ., 1824. (Gr., "one" + "claw.")

659 (8825). Mononychus vulpeculus Fab., 1801, 450.

Broadly ovate. Black, shining; under surface, except the middle of third and fourth ventrals, sides of thorax and basal third of suture densely clothed with oval whitish-yellow scales; antennæ pale brownish-yellow. Occiput and thorax coarsely, densely and shallowly punctate. Elytral striæ shallow, punctate; intervals wide, flat, each with one or two rows of large punctures. Male pygidium protuberant, fifth ventral strongly foveate, middle and hind tibiæ clawed at tip; female, pygidium strongly excavated, fifth ventral very convex, tibiæ unarmed. Length 4.5—5 mm.

Common throughout northern Indiana wherever its food plant, the blue flag, *Iris versicolor* L., occurs; not taken south of Marion Co.; May 21—June 29, mating on the former date. Frequent near New York City, May to September. Ranges from New England and Canada to Wisconsin, south to Georgia. The larvæ breed in the seed pods of *Iris* while the adult feeds upon the pollen and buds. Our largest member of the tribe. The upper surface is largely naked, though Dietz states that it is "densely clothed with black scales."

Subtribe II. Cœliodes.

Species of small size having the eyes in repose more or less covered by postocular lobes; beak cylindrical, slender, received in a groove which extends back at least as far as the mesosternum; legs long and slender, femora stout, usually more or less grooved on the outer side to receive the tibiæ in repose; third joint of tarsi broadly bilobed, fourth with two claws which are cleft or toothed. Eight genera were recognized by Dietz, all of which are represented in our territory. *Calogaster* of the subtribe Phytobii possesses many of the characters of this tribe.

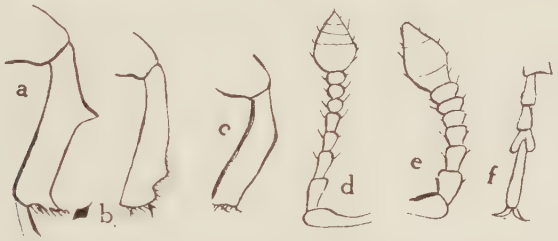


Fig. 99. Structures of Ceutorhynchini. *a*, Front tibia of *Cnemogonus*; *b*, hind tibia of *Acanthoscelis curtus*; *c*, front tibia of *Auleutes cruralis*; *d*, antenna of *Ceutorhynchus ovalis*; *e*, same of *Pelenomus sulcicollis*; *f*, tarsus of *Phytobius*. (After Dietz.)

KEY TO GENERA OF SUBTRIBE CŒLIODES.

a. Femora not toothed, grooved beneath for the reception of the tibiæ; second ventral segment shorter at the middle than the next two united, prolonged backward at sides so that its posterior lateral angle reaches the fourth segment, cutting off the third, which often fails to reach the margin.

b. Tibiæ flattened, toothed or angulated on the outer sides near the base. (Fig 99, *a*.)

c. Pectoral groove extending onto the metasternum; thorax with four large tubercles. II. Craponius.

cc. Pectoral groove not reaching onto the metasternum; thorax with two obtuse tubercles. III. Cnemogonus.

bb. Tibiæ not flattened nor dentate near the base.

d. Outer apical angle of front tibiæ prolonged in a toothed process. IV. Acanthoscelis.

dd. Outer angle of front tibiæ not produced. (Fig. 99, *c*.)

e. Hind femora not conspicuously dilated.

f. Elytra without crests of erect scales. V. Auleutes.

ff. Surface of elytra very uneven, with crests of erect scales. VI. Pelenosomus.

ee. Hind femora strongly dilated. VII. Hypocœliodes.

aa Femora toothed beneath, not grooved for the reception of the tibiæ in repose; second ventral longer at the middle than the third and fourth united, not prolonged at sides.

g. Elytra widest behind the middle; metasternum very short. VIII. ACALLODES.

gg. Elytra not widened behind the middle; metasternum of moderate length. IX. CŒLIODES.

II. CRAPONIUS Lec., 1876.

Beak rather stout, curved, punctured; antennæ inserted at middle, male, two-fifths from base, female; second joint of funicle as long as the next three united; tooth of tarsal claws slender, acute, half as long as the claw. One species is known.

660 (8826). CRAPONIUS INÆQUALIS Say, 1831, 20; ibid, I, 286.

Broadly oval, very robust. Dark brown or piceous, rather thickly clothed above with dark brown and whitish scale-like hairs, the latter arranged to form very small spots or transverse lines on elytra; antennæ and legs dark reddish-brown. Beak stout, shorter than thorax, coarsely, densely and shallowly punctate. Thorax short, conical, constricted near apex; disc coarsely and closely punctate, with an entire median groove, each side of which are two large tubercles. Elytra at base nearly two-

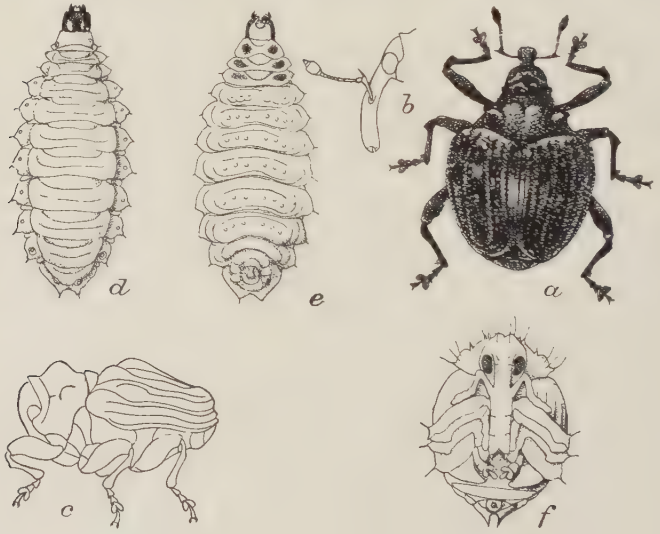


Fig. 100. *Craponius inæqualis* Say. *a*, Beetle from above, × 10; *b*, head, beak and antenna from side; *c*, side view of beetle; *d*, larva from above; *e*, same from below; *f*, pupa showing beak concealed in prosternal groove. (After Quaintance & Shear.)

thirds wider than thorax, deeply impressed on basal third; striæ narrow, punctate; alternate intervals elevated and interrupted, thus causing the surface to appear very rough or unequal and mimicing mummied grapes or caterpillar excrement. Beneath coarsely punctured, each puncture bearing a narrow whitish scale. Last ventral of male with a deep circular fovea. Length 2.4—3 mm. (Fig. 100.)

Steuben, Marshall and Putnam counties, Ind., probably throughout the State; June 11—Sept. 25. Frequent near New York City in May and June. Ormond, Eustis and Dunedin, Fla.; Feb. 11—April 13. Ranges from New England to Minnesota, south to Florida, being apparently most abundant in the Ohio valley states and Missouri, where it becomes of sufficient economic importance to have inspired special bulletins by Walsh and Brooks, and more or less extended notices by numerous other economic entomologists. Known as the "grape curculio" or "grape-seed curculio," as it occurs on both wild and cultivated grapes, the adults feeding on the green upper layer, or epidermis, of the leaves, leaving numerous minute transverse marks (made by the jaws in scraping) of a whitish color, that late in the fall cause the foliage to look parched. No serious injury results from such feeding by adults but the larvæ are destructive to the fruit. The eggs are laid singly in punctures made by the beak in the grape, the young larvæ penetrating to the seed within a few days, and eventually causing the grape to drop to the ground in which, at a depth of a half inch or less, the insect pupates in an earthen cocoon. It takes an average of six days for the egg to hatch, 18 for the larva to reach full size and 18 more for pupation, while the period of adult life is said to average slightly over a year. The number of eggs laid by each female during her long life is more than 250. While many natural enemies tend to keep its numbers down, the long adult life and large egg-laying capacity make serious outbreaks always possible, and Brooks quotes statements of grape growers showing losses of 50 per cent. of the crop. The most effective remedy is bagging the fruit, which is said to cost $2.00 per thousand bunches, and to afford protection from rot as well as from curculio.

Walsh (1868) says of *inæqualis*: "The least touch will fetch them off the vine; for this whole group of roundish snout beetles (Ceutorhynchids) drop to the ground when alarmed more readily even than the plum curculio. Indeed I have repeatedly observed that they will often drop as soon as they see you looking at them, although the plant on which they are sitting be not touched at all." Brooks, however, records that, while the female was ovipositing, he removed the grape and, through his hand lens, watched the completion of her task.

III. Cnemogonus Lec., 1876. (Gr., "leg" + "angle.")

From Craponius this genus is separated by having the pectoral groove shorter; tibiæ flattened, with a large triangular tooth

near the base (Fig. 99, *a*), not grooved for the reception of the tarsi, the outer apical angle of the front pair produced in a process; tarsal claws with a short acute tooth. One species is known which in collections has been found mixed with *Rhinoncus pyrrhopus*. The large tooth of the tibiæ is, however, readily seen if looked for.

661 (——). CNEMOGONUS LECONTEI Dietz, 1896, 392.

Stout, trapezoidal. Dark brown to piceous, densely clothed above with blackish scales mixed with short whitish pubescence; condensed in a cruciform scutellar spot and less defined smaller spots on disc of elytra. Beak subcarinate, punctured. Thorax strongly constricted near apex, disc densely, finely punctured, more coarsely toward base; dorsal channel distinct in basal two-fifths, with a small obtuse tubercle each side. Elytra less than one-third wider at base than thorax; striæ wide, with shallow remote punctures; intervals, except the two or three outer ones, each with a row of minute transverse tubercles. Under side coarsely punctured, each puncture bearing a pale scale. Last ventral of male with a coarsely punctured fovea; that of female transversely impressed before its apical margin. Length 3.3—4 mm.

Whiteface Mt., Adirondacks, N. Y., July 1—13; found on the summit apparently floated up by air currents from the woods below. Recorded from Ontario, Canada; Hazelton, Pa.; Michigan and the Lake Superior Region, and Great Slave Lake, B. C.

IV. ACANTHOSCELIS Dietz, 1896. (Gr., "spine" + "tibia.")

The species comprising this genus were formerly included with *Cœliodes*, from which genus they differ especially in the form of the ventral segments and in the front tibiæ being prolonged outwards at tip. They have the beak nearly straight, shorter and more cylindrical in the male; thorax constricted near apex and with small acute tubercles on the sides: scutellum not visible; pectoral groove not reaching metasternum; third ventral narrowed at ends but reaching the side margin.

KEY TO EASTERN SPECIES OF ACANTHOSCELIS.

a. Middle and hind tibiæ stout and distinctly widened and toothed toward apex (Fig. 99, *b*.); upper margin of eye elevated; intervals of elytra convex. 662. CURTUS.

aa. Middle and hind tibiæ more slender, not toothed or widened toward apex.

b. Tarsi broad; upper margin of eye not raised above the level of the front; intervals of elytra flat; larger, 3—3.7 mm. 663. ACEPHALUS.

bb. Tarsi slender; upper margin of eye slightly elevated; outer joints of funicle widened; smaller, 2.7—3 mm. 664. MENDICUS.

662 (8828). Acanthoscelis curtus Say, 1831, 29; ibid. I, 298.

Broadly oval, robust. Dark piceous, rather densely clothed with small brown scales mottled with spots of pale scales, which form a transverse row verse row of four spots and another behind apical margin of three spots; surface of elytra mottled pale and dark; antennæ and legs reddish-brown. Thorax convex, less than one-half wider than long, disc densely punctured and with a small acute tubercle each side of the dorsal channel, the latter distinct only near base. Elytra at base two-fifths wider than thorax, striæ with large punctures partly concealed by scales; alternate intervals wider and a little more convex. Male with the fifth ventral feebly impressed. Length 3—3.5 mm.

Frequent throughout southern Indiana, not yet taken in the northern counties; May 16—July 13. Occurs near New York City on *Polygonum* in swamps. Ranges from New England to Montana and Arizona.

663 (8835). Acanthoscelis acephalus Say, 1824, 309; ibid, II, 173.

Broadly oval. Blackish, above nearly uniformly clothed with grayish-yellow scales, which give it a distinct grizzly appearance; antennæ and legs dark reddish-brown; beneath clothed with large oval ashy-gray scales. Beak as long as thorax, rather stout, cylindrical, entirely scaly in male, more slender with apical half shining in female. Thorax two-thirds wider than long, sides rounded; dorsal channel distinct only at base, the lateral tubercles small, obtuse. Elytra one-fourth wider at base than thorax, scarcely as long as wide, distinctly narrowed behind; striæ coarse, their punctures small. Male with ventral segments 2—5 broadly impressed and clothed with elongate grayish scales. Length 3—3.7 mm.

Frequent throughout Indiana, May 23—August 2, in the axils of the leaves of the evening primrose, *Onagra biennis* L. Common all along the shore of New Jersey, May to September, on the same plant. "Lives on *Polygonum* especially *P. hydropiper*." (*Hamilton.*) Ranges from Canada and New England to Michigan, Colorado and Kansas, south to Georgia.

664 (——). Acanthoscelis mendicus Dietz, 1896, 400.

Oblong oval. Dark piceous, legs rufo-piceous; above clothed with dark brown and pale gray scales, the pale ones of thorax forming a median trans- of four spots just behind the middle, and a number of small spots and oblique lines on elytra; scales of under surface large, dirty white. Thorax as long as wide at base, widest behind the middle, tubercles minute, disc closely and rather finely punctured; dorsal channel well impressed only at base. Elytra nearly one-third wider at base than thorax, about as long as wide; striæ wide, deeply, closely and distinctly punctate; intervals convex. Length 2.7—3 mm.

Rabun Co., Georgia, July. Described from Georgia, Florida and Columbus, Texas. "Recognized by the predominant dark brown color of its scales, small size and distinctly widened outer

joints of antennal funicle, the seventh joint being twice the thickness of second." (*Dietz.*) A series of *curtus* collected in Virginia and Maryland in June, seems to indicate a possibility that *mendicus* may prove merely a southern race of that species.

V. AULEUTES Dietz, 1896. (Gr., "sulcate.")

Small robust forms, rarely over 3 mm. in length, having the beak rather stout, cylindrical, feebly curved; eyes with elevated orbital margin, partly or wholly concealed in repose; thorax with distinct lateral tubercles; pectoral groove deep, usually extending upon the metasternum. They are dark colored insects, thinly clothed with a fine scale-like pubescence and mainly separated from *Cœliodes*, with which they were formerly grouped, by the short second ventral and the grooved unarmed femora.

KEY TO EASTERN SPECIES OF AULEUTES.

a. Metasternum distinctly excavate and emarginate, forming the hind limit of the pectoral groove.
  b. Elytra evidently roughened; front not concave; fore and middle tibiæ not subangulate near base.
    c. Funicle 7-jointed.
      d. Claws armed with a long slender tooth; eyes only partly concealed in repose; larger, 2—3 mm.
        e. Alternate elytral intervals slightly wider, more convex and more conspicuously tuberculate; brownish-black mottled with white. 665. ASPER.
      ee. Intervals nearly equal.
        f. Stouter; thorax scarcely wider than long; elytral tubercles more obvious. 666. TENUIPES.
        ff. Less robust; thorax distinctly wider than long. 667. ATER.
      dd. Claws with a short tooth; eyes wholly concealed in repose; smaller, not over 2 mm.
        g. Black, elytra with a white cruciform scutellar spot and short cross-bar each side. 668. SUBFASCIATUS.
        gg. Dark brown, sutural spot and scattered erect scales, white. 669. TACHYGONOIDES.
    cc. Funicle 6-jointed; alternate intervals of elytra strongly elevated. 670. MARIONIS.
  bb. Elytra without evident asperities; front concave between the eyes; fore and middle tibiæ subangulate near base (Fig. 99, *c.*); elytra with a cruciform scutellar spot. 671. CRURALIS.
aa. Metasternum not or very feebly emarginate, not entering into the formation of the pectoral groove; elytra not roughened; scales brownish, mottled with white. 672. NEBULOSUS.

665 (8830). AULEUTES ASPER Lec., 1876, 270.

Broadly oval, robust. Dark brown or blackish; thorax with some scattered white scales and elytra with indistinct scutellar spot and

more conspicuous mottlings of whitish scales; antennæ and legs reddish-brown. Beak rather short, stout, carinate, striate each side, coarsely punctured and pubescent. Thorax slightly wider than long, sides feebly rounded, disc broadly, not distinctly constricted near apex, densely not coarsely punctured, the dorsal channel distinct only on basal third. Elytra one-third wider at base than thorax, about as long as wide, deeply striate; intervals wider than the striæ, convex, each with a row of small, distant, acute tubercles. Outer apical angles of front tibiæ with a small spine. Length 2—2.5 mm.

Pulaski Co., Ind., rare; July 16. Beaten from huckleberry. Nelson Co., Va., Aug. 3. Ottawa, Canada, May 13. Ranges from Canada and District of Columbia to Montana, south to Kansas and Connecticut. Known also from Maine and Massachusetts.

666 (8829). AULEUTES TENUIPES Lec., 1876, 270.

Oval, robust. Above pitchy-black, very thinly clothed with fine pale pubescence, mixed with white scales, the latter forming on elytra a cruciform scutellar spot (often indistinct) and another oblique, more or less interrupted spot about two-fifths from base; under surface more densely scaly, coarsely, not closely punctured; antennæ and tarsi dark reddish-brown. Beak cylindrical and punctured throughout, male, slightly tapering and smooth toward tip, female. Thorax with disc very coarsely and closely punctured, its lateral tubercles acute, dorsal channel deep toward the base. Elytra one-third wider at base than thorax, striæ wide, deep, coarsely punctate; intervals each with a row of small acute granules bearing short seta-like hairs. Front tibiæ without apical spine. Length 2.5—3 mm.

Putnam Co., Ind., rare; Sept. 25. Watatic Mt., Mass., Sept. 3. Litchfield, Conn., Orange Mts., N. J., and West Point, N. Y.; June 27—August 28. Ottawa, Canada, June 20. Ranges from New England and Canada to Missouri, Georgia and Texas. Pierce (1907, 279) states that at Dallas, Texas, it breeds in the buds of Hartweg's primrose, *Galpinsia hartwegi* Benth., and pupates in the ground, the time from egg to adult comprising about 24 days.

667 (——). AULEUTES ATER Dietz, 1896, 405.

Short, very robust. Brownish-piceous. "Differs from *tenuipes* in being subrhomboidal, more strongly narrowed posteriorly. Beak a little shorter; thorax distinctly wider than long, more rounded on sides, dorsal channel quite obvious, nearly entire. Elytral intervals not distinctly tuberculate, but with rows of close-set, very minute, acute asperities. Scutellar spot not cruciform, confined to the sutural interval. Length 3 mm." (*Dietz.*)

Steuben Co., Ind.; June 17. Described from Hazelton, Pa., and Texas. Occurs in swampy meadows, also on *Epilobium*.

668 (——). AULEUTES SUBFASCIATUS Dietz, 1896, 406.

Broadly oval. Pitchy black; above thinly clothed with fine, short pubescence; elytra with a cruciform spot of white scales, its transverse bar

being about one-third from base and narrowly separated from an interrupted cross-bar a little behind the middle; antennæ, tibiæ and tarsi reddish-brown. Beak stout, cylindrical, as long as thorax, coarsely striate-punctate. Thorax one-half wider than long, broadly, not strongly constricted near apex; disc coarsely, closely and deeply punctured, lateral tubercles distinct, dorsal channel ill-defined. Elytra one-third wider at base than thorax, not longer than wide, humeri prominent; striæ deep, punctate; intervals convex, each with a row of small acute granules bearing conspicuous setæ; under side coarsely punctate. First ventral of male with a small rounded, deeply impressed fovea. Length 1.7—2 mm. (Fig. 101. A.)

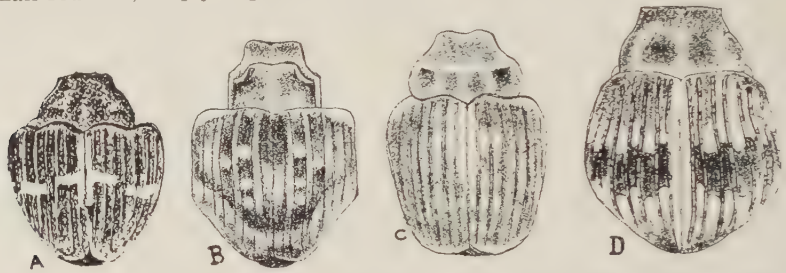


Fig. 101. A, *Auleutes subfasciatus* Dietz; B, *Pelenosomus cristatus* Dietz; C, *Hypocœliodes ulkei* Dietz; D, *Acallodes ventricosus* Lec. (After Dietz.)

Steuben Co., Ind., rare; July 5. Edgebrook, Ill., May 6. Alexandria, Va., Sept. 2. Ranges from Maryland and Detroit, Michigan, to South Carolina and Alabama. "Easily recognized by its robust form, small size, long and stout beak, prominent postocular lobes, elytral ornamentation and short tooth of claws." (*Dietz.*)

669 (——). AULEUTES TACHYGONOIDES Dietz, 1896, 407.

Resembles *subfasciatus* but with much shorter, more finely sculptured beak and large, scattered white, erect scales on elytra; the latter also with a conspicuous white line on the sutural interval extending about one-third its length. Last ventral of male without fovea. Length 1.7—2 mm.

Lake Ashley and Jacksonville, Fla. Mobile, Ala., July. Described from District of Columbia and Texas.

670 (——). AULEUTES MARIONIS Fall, 1913, 68.

Broadly oval, robust. Pitchy brown, thinly clothed with very short brownish hairs with short intermixed whitish ones which form small scattered spots on elytra. Beak stout, as long as thorax, feebly striate, coarsely and densely punctate. Funicle 6-jointed, first three joints subequal in length, first stouter, second and third each longer than fourth and fifth together. Thorax distinctly wider than long, narrowed and deeply constricted near apex, disc densely and rather coarsely punctate; dorsal channel entire, lateral tubercles small, acute. Elytra at base three-fourths wider than thorax, fully as wide as long; striæ coarsely punctate; alternate intervals wider and strongly elevated, roughened with small acute granules. Tarsal claws with a short acute tooth. Length 2.3 mm.

Described from a single specimen taken at Marion, Massachusetts. Closely resembles *Craponius inæqualis* but differs in generic characters. Our only eastern species having 6-jointed funicle.

671 (8831). Auleutes cruralis Lec., 1876, 270.

Oval, robust. Dark, piceous, above mottled with small white scales; which on the elytra form a cruciform scutellar mark, two or three distinct spots arranged in an oblique line just behind the middle and scattered spots near apex; suture rarely wholly white; under side sparsely scaly. Beak as long as thorax, rather slender, curved, cylindrical, bistriate, punctured; entirely scaly, male; bare toward apex, female Thorax one-half wider than long, rounded on the sides, broadly and rather strongly constricted near apex, closely and coarsely punctate; median channel entire, broad, not deep, lateral tubercles acute. Elytra one-fourth wider at base than thorax longer than wide, sides nearly straight, converging behind middle; intervals convex, wider than the striæ, the latter with small, close-set punctures. Length 2.2—2.25 mm.

Springfield, Framingham and Tyngsboro, Mass., July 7—16; Paris, Maine, July 7. Recorded also from Orange Mts. and Hudson Co., N. J., in swamps. Ranges from Anticosti Island, Newfoundland and Lake Superior to Utah, south to Pennsylvania and Texas. Placed by Dietz as a synonym of the European species *A. epilobii* Payk, but comparison with undoubted specimens of the latter in the Leng and U. S. National Museum collections show *epilobii* to be a much larger and more convex species, with broader and less constricted thorax and with the white markings of the elytra much less distinct.

672 (8832). Auleutes nebulosus Lec., 1876, 271.

Broadly oval. Dark brown or piceous, thinly clothed with fine brownish scales with a distinct coppery lustre, and mottled with spots of larger whitish-scales, which form on the elytra a faint post-scutellar spot, an interrupted curved median cross-bar and some irregular spots on apical third; antennæ, tibiæ and tarsi pale reddish-brown; under side closely and rather coarsely punctate, each puncture bearing a small, oval scale. Beak longer than thorax, finely striate and punctate, smooth toward tip in female. Thorax one-half wider than long, strongly narrowed in front, its apex emarginate with an acute cusp each side, lateral tubercles distinct, surface densely and coarsely punctured. Elytra two-fifths wider at base than thorax, striæ narrow, marked with close-set punctures; intervals wider than striæ, feebly convex, finely granulate toward apex. Length 2—2.2 mm.

Steuben, Starke and Marshall counties, Ind., scarce; May 19—June 16; beaten from oak. Throughout New Jersey, March to September; not common. Dunedin and Ft. Myers, Fla.; Jan. 26

March 27. Ranges from Canada and New England to Washington, south to Florida and Mississippi. Occurs on miscellaneous vegetation near water. (*Harrington.*) Easily known by its small size, coppery lustre and truncate metasternum.

VI. Pelenosomus Dietz, 1896. (Gr., Pelenomus + "body.")

The only known species of this genus closely resembles certain forms of *Pelenomus* but differs by the longer beak, the pectoral groove extending onto the mesosternum and the strongly toothed claws. From *Auletes*, to which it is closely related, it is separated by the great irregularity of the thorax, the tufts and crests of erect scales on the elytra and the dense scaly covering.

673 (——). Pelenosomus cristatus Dietz, 1896, 411.

Oval. Dark piceous, antennæ, tibiæ and tarsi reddish-brown; above densely clothed with small grayish-white and brown scales; elytra with crests of erect seal-brown scales interrupted by spots and short lines of white depressed ones, a basal line on sutural interval of very dark velvety scales, and an ill-defined brownish oblique fascia extending from humerus to behind the middle. Beak slightly shorter than thorax, gradually widened from base to apex, densely punctured and pubescent. Thorax about as long as wide, dorsal channel distinct; disc densely, not coarsely punctate, with two small cusps on front margin and a ridge and oblique groove on each side. Elytra two-fifths wider at base than thorax, sides straight and parallel to near middle, then obliquely narrowed to apex; striæ fine, feebly impressed, their punctures hidden by a row of scales; intervals flat. Under surface rather coarsely punctured, sterna densely scaly. Length 1.8—2.2 mm. (Fig. 101, B.)

Mobile, Ala., March 28; one specimen in Leng collection taken by Loding. The type, a male from the District of Columbia, is in the Ulke collection.

VII. Hypocœliodes Faust, 1896. (Gr., "sub" + Cœliodes.)

Broadly oval, very convex species having the hind femora greatly enlarged;* beak stout, curved; pectoral groove extending upon the metasternum; second ventral shorter than the two following united, prolonged backwards at sides; hind coxæ widely separated; femora deeply grooved for the tibiæ in repose; tarsal claws with a long acute tooth. Faust's name antedates *Orchestomerus* Dietz by a few months.

*Champion says this perhaps indicates saltatorial powers and mentions that the European *Rhinoncus perpendicularis*, with less thickened femora, can jump a considerable distance. *Hypocœliodes* is well represented in Mexico, where fresh specimens are often more or less coated with a waxy fulvous secretion as in *Lixus*.

674 (——). Hypocœliodes ulkei Dietz, 1896, 413.

Pitchy-brown, above sparsely clothed with white scales, forming a spot on thorax in front of each obtuse lateral tubercle and a cruciform scutellar spot and ill-defined spots and bands on elytra; humeri white; antennæ and tarsi brownish-yellow. Beak cylindrical, striate and punctured on basal half, pubescent throughout. Thorax nearly one-half wider than long, sides broadly rounded; ocular lobes prominent; disc closely punctured, the dorsal channel distinct only on basal half. Elytral striæ deep, wide, closely punctured; alternate intervals wider, punctate. Length 2.7 mm. (Fig. 101, C.)

Known also from a single male from New York, now also in the Ulke collection.

VIII. Acallodes Lec., 1876. (Gr., "without" + "beauty.")

Robust, ovate or pear-shaped species having the funicle 7-jointed, its first joint stout, second elongate, slender, 3—7 short; thorax with prominent ocular lobes but without lateral tubercles; front coxæ prominent, hind ones widely separated; claws armed with a long tooth.

KEY TO SPECIES OF ACALLODES.

a. Thorax scarcely wider than long, not wider at base than at middle; elytra with a well defined dark median cross-bar.
b. Elytra distinctly longer than wide. 675. ventricosus.
bb. Elytra not longer than wide. 676. lysimachiæ.
aa. Thorax much wider than long, widest at base; elytra as wide or wider than long, their dark cross-bar very faint. 677. saltoides.

675 (8836). Acallodes ventricosus Lec., 1876, 272.

Ovate, strongly convex. Dark reddish-brown, thinly clothed with narrow whitish hair-like scales which form pale median and lateral lines on thorax and an elongate white scutellar spot, a sub-oblique cross-bar before the middle and a transverse one on apical third of elytra, the space between the two bars a little darker; antennæ and tarsi pale reddish brown. Beak stout, curved, as long as thorax, slightly widened toward tip, strongly punctured, glabrous. Thorax slightly wider near base than long, sides rounded on basal half, disc broadly constricted near apex, densely and coarsely punctate. Elytra at base scarcely wider than thorax, distinctly longer than wide, widest behind the middle, thence rapidly converging to the conjointly rounded apex; striæ deep, coarsely punctured; intervals convex, rugose. Length 2.8—4 mm. (Fig. 101, D.)

Lake County, Ind., rare; May 30. Edgebrook and Beverly Hills, near Chicago, Ill.; May 21—June 14. Hamden, Conn.; June 14. Numerous records near New York City; May to July. LeConte described it from two specimens, yet said it occurred in

the "Middle and Western States." Dietz gives its range as Eastern, Middle and Southern States. Recorded heretofore definitely only from New Jersey, Pennsylvania, Michigan and District of Columbia, usually as rare; probably a member of the Alleghenian fauna. Taken by Dietz on apple trees in August.

676 (——). ACALLODES LYSIMACHIÆ Fall, 1913, 67.

Closely allied to *ventricosus*. Reddish to dark brown, the elytral bands of narrow whitish scales made up of elongate spots on the intervals, but not more advanced on the alternate intervals as in *ventricosus*. Elytra shorter, more convex, not perceptibly longer than wide; humeri more narrow. Femora more feebly toothed. Length 2.5—3 mm.

Sherborn, Mass.; May 16. Described from Tyngsboro, Mass., where it occurs abundantly in September on the bulb-bearing loose-strife, *Lysimachia terrestris* L.

677 (——). ACALLODES SALTOIDES Dietz, 1896, 416.

Broader and more convex than *ventricosus*. Ground color as there, the white markings of elytra very faint. Thorax two-thirds wider than long, two-fifths wider at base than apex, dorsal channel less distinct, disc much more finely punctured. Elytra wider at middle than long, humeri absent, sides strongly rounded; striæ deep, almost as wide as the intervals. Under surface and pygidium very coarsely punctate. Length 2.8—3.3 mm.

Described from Minnesota. Known also from Plummer's Island, Md., Clarksville, Tenn., and Iowa.

IX. CŒLIODES Schön., 1837. (Gr., "swollen.")

Dietz, in his "Revision of the Ceutorhynchini," so split up and dismembered this genus that it contained as he left it but two known North American species. They are oval robust forms having the beak slender, curved, longer than thorax; eyes wholly concealed in repose; elytra wider at base than thorax, not widened behind the middle; pectoral groove limited behind by the metasternum; second ventral longer at middle than the next two united, third not narrowed at the ends and reaching the side margin of abdomen; femora toothed beneath.

KEY TO NORTH AMERICAN SPECIES OF CŒLIODES.

a. Tubercles of thorax wanting; elytra with tips and a spot each side pale. 678. FLAVICAUDIS.

aa. Thorax with distinct lateral tubercle; elytra without pale spots. 679. VITIOSUS.

678 (8834). CŒLIODES FLAVICAUDIS Boh., Schön., 1844, 397.

Oblong-oval, robust. Dark brown, thickly clothed above with small, narrow brown, and larger, more oval whitish-yellow scales, the latter

covering the sides and forming a narrow median line on thorax, and on elytra arranged in a sutural line on basal third, with an oblique spot near middle of sides and a narrow irregular apical cross-bar more conspicuously whitish; antennæ, tibiæ and tarsi paler reddish-brown; under surface thickly clothed with large oval, dirty white scales. Beak densely punctured, finely carinate. Thorax slightly wider than long, sides strongly rounded; disc deeply constricted near apex, densely and finely punctate, its dorsal channel entire, deep except at middle. Elytra at base one-fourth wider than thorax, sides broadly rounded; striæ deep, finely punctate, each puncture closed by a pale scale; intervals wide, nearly flat. Males with fifth ventral transversely impressed and middle and hind tibiæ clawed at tips. Length 2.7—3.3 mm.

Lake, Steuben, Kosciusko and Lawrence counties, Ind., scarce; May 10—June 16. Near Shrewsbury, N. J., on nettle, *Urtica dioica* L. Ranges from New England and Canada west and southwest to Wisconsin, Colorado and Texas. This species, known in collections and listed by Henshaw under the above name, was redescribed by Dietz under the name *apicalis*, he claiming that Boheman's description was "utterly inapplicable in all essential points save one to the insect in hand." Be that as it may, there is no other species of the tribe so colored as to have the name *flavicaudis* applied to it, and until Boheman's type is shown by actual examination to be something else we deem it best to retain the name by which it is best known. Specimens in the Cambridge collection are labelled "*C. carduii* Herbst" in LeConte's writing.

679 (——). Cœliodes vitiosus Dietz, 1896, 418.

"Oval, elliptic, convex. Dark piceous; antennæ, tibiæ and tarsi rufopiceous; scales on under side larger, nearly round, dirty gray, not crowded; above clothed with much smaller oval grayish-brown scales." Otherwise much as in *flavicaudis*. Length 2.5 mm.

Described from a single male taken at Hazelton, Pennsylvania.

Subtribe III. Ceutorhynchi.

Small robust species primarily distinguished by the long, slender, curved beak, usually nearly half the length of body, and the short pectoral groove which does not extend behind the front coxæ but is sharply limited by acute antecoxal ridges. In addition, they have the eyes rounded, widely separated above, and wholly or partially covered in repose by the postocular lobes; thorax narrowed in front, generally constricted near apex; elytra not much wider at base than thorax, striate and punctate; second

ventral not prolonged backwards at sides, third and fourth short, fifth longer, impressed or foveate in the males. One of the two genera comprising the subtribe is represented in our territory.

X. CEUTORHYNCHUS Germ., 1824. (Gr., "hidden" + "beak.")

To this genus as characterized above, and having the mesosternum oblique, not sulcate; middle coxal cavities closed within; ventral segments 3—5 unequal and third tarsal joint bilobed, Dietz ascribes 47 North American species, several of which are doubtless synonyms. For convenience of treatment our eastern species are separated into three groups.

KEY TO GROUPS OF EASTERN SPECIES OF CEUTORHYNCHUS.

a. Hind femora toothed beneath; funicle 7-jointed except in *decipiens*. GROUP A.

aa. Femora not toothed.

b. Funicle 7-jointed. GROUP B.

bb. Funicle 6-jointed. GROUP C.

GROUP A.

Nine of our eastern species, all of moderate size and having at least the hind femora toothed beneath, belong here.

KEY TO SPECIES OF GROUP A.

a. Elytra either steel-blue or greenish-blue with metallic lustre.

b. Claws toothed; thorax broadly constricted near apex. 680. CYANIPENNIS.

bb. Claws simple; thorax strongly constricted near apex. 681. BOLTERI.

aa. Elytra not steel- or greenish-blue in color.

c. Elytra black with bronzed lustre; claws with a short acute basal tooth. 682. ÆRATUS.

cc. Elytra black or brown, without bronzed lustre.

d. Larger, 2.7—3.2 mm.; elytra finely sculptured, closely pubescent or scaly; male, except in *quadridens*, with two elevations on last ventral segment.

e. Elytra uniformly pubescent or scaly and without scutellar white spot.

f. More elongate, scales white. 683. RAPÆ.

ff. Broader, scales brown. 684. SULCICOLLIS.

ee. Elytra with a scutellar white spot.

g. Scales white, not uniform, intermixed with coarse hair; last ventral segment of male impressed. 685. QUADRIDENS.

gg. Scales white in single rows in striæ; brownish appressed hairs in several confused rows on intervals. 686. MARGINATUS.

dd. Smaller, 2.5 mm.; elytra coarsely sculptured, sparsely pubescent and with a basal white spot on suture, their striæ deep and sulciform; male with impression on last ventral.

h. Funicle 7-jointed; form broader; thoracic tubercles acute; antennæ and tarsi piceous; last ventral of male with circular impression. 687. SULCIPENNIS.

hh. Funicle 6-jointed; form more elongate; tubercles of thorax obtuse or lacking; antennæ and legs rufous; last ventral of male with transverse impression. 688. DECIPIENS.

680 (——). CEUTORHYNCHUS CYANIPENNIS Germ., 1824, 235.

Oblong-oval, subdepressed. Black, elytra steel-blue, shining; above very sparsely clothed with very fine, short pubescence, and with a small scutellar spot of white scales; under surface not densely punctured, sparsely scaly, side pieces of thorax more densely scaly, the disc almost naked. Beak slightly longer than thorax, male; one-half longer, female, curved, slender, tapering from the base, striate on basal half, punctured throughout, more finely toward tip. Thorax scarcely wider than long, widest near base, strongly narrowed and broadly constricted near apex, lateral tubercles obtuse, prominent; dorsal sulcus deep, surface coarsely and densely punctured. Elytra one-fourth wider at base than thorax, striæ fine, shallow, punctured; intervals flat, rugose. Length 2.7—3.2 mm.

Starke Co., Ind., rare; May 21. Edgebrook, Ill., May 6. Ithaca, Johnstown, Sport Island and Portage, N. Y., May 24—July 5. Ranges from Canada and New England west to Idaho and California, south to Maryland. A well known European species which, in that country, attacks cabbage, rape, horseradish, and also wild cruciferous plants. Easily known by its blue elytra and toothed claws.

In many collections, even that of LeConte at Cambridge, this species bears the name *C. erysimi* Fab., also a greenish European species but with unarmed femora, deep elytral striæ and under surface with bronzed lustre.

681 (——). CEUTORHYNCHUS BOLTERI Dietz, 1896, 432.

Oblong-oval. Head, thorax, legs and under surface black, rather thickly clothed with dirty yellowish pubescence; elytra dark steel-blue with a faint scutellar spot of white scales. Thorax shorter, narrower and more constricted in front, disc more finely punctured, its lateral tubercles much more acute and distinct than in *cyanipennis*. Elytra shorter, the intervals less rugose than there. Femora feebly clavate, all armed with an acute tooth. Length 2.3—2.5 mm.

Starke Co., Ind., rare; May 19. Millburn and Irvington, N. J.; May 30. Ithaca, N. Y., May 21. Also closely resembles the European *C. erysimi* Fab., but differs by the toothed hind femora. From *cyanipennis*, our only other species with blue elytra, it may be separated by its smaller size, darker hue, more acute lateral tubercles of thorax and simple claws. The type of *C. hirticollis* Dietz (1896, 433) at Cambridge is only a darker colored form of *bolteri*.

682 (——). CEUTORHYNCHUS ÆRATUS Dietz, 1896, 431.

Elongate-oval. Black with bronzed lustre, thinly clothed above with fine pubescence, condensed in a scutellar white spot and on sternal side pieces; otherwise similar to *cyanipennis*. Length 2.5 mm.

Described from a single male from Ohio, now in the Ulke collection. Very probably a color variety of *cyanipennis* or an abnormal *marginatus*.

683 (8838). CEUTORHYNCHUS RAPÆ Gyll., Schön., 1837, 547.

Oblong-oval, robust. Black, above uniformly clothed with hair-like scales which are yellowish in newly matured, grayish in old or hibernated specimens; beneath thickly clothed with larger whitish oval scales. Beak slender, cylindrical, slightly longer than head and thorax, finely punctured, striate on basal half; antennæ inserted near its middle, first and second joints of funicle each about as long as third and fourth united. Thorax near base one-third wider than long, thence strongly narrowed to and deeply constricted near apex; disc densely and coarsely punctate, its dorsal channel entire, more deeply impressed near base and apex. Elytra one-fourth wider at base than thorax, sides nearly straight and parallel to beyond middle, thence converging to the rounded apex; striæ fine, punctured; intervals wider, flat, rugose, the declivity with small acute granules. Length 2.7—3.2 mm. (Fig. 102.)

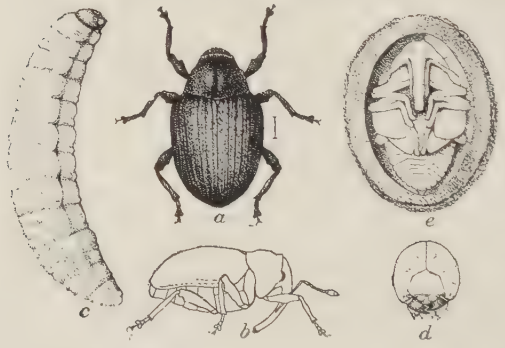


Fig. 102. *a*, Beetle, × 8; *b*, side view of same; *c*, larva; *d*, head of larva; *e*, pupa in cocoon. (After Chittenden.)

Frequent in northern and central Indiana, much less so in the southern counties; May 6—Oct. 6. Taken by sweeping hedge mustard and pepper-grass. Locally abundant near New York City on cabbage, rape and other cruciferous plants. Ranges from Canada and New England to California, mainly in the Upper Austral life zone. This species was redescribed by Dietz under the name *C. affluentus* but Chittenden (1900, 41), in a very full account of the life habits of the beetle, has shown that the insect so described is none other than the well known European form, *C. rapæ*.

It was introduced into New England about 1855 and is known as the "cabbage curculio," the larvæ feeding within the stems and on the edges of the leaves of cabbage, turnip, horse-radish, cauli-

flower and many other cultivated and wild forms of the mustard family, often doing much damage to the cultivated plants. The eggs are deposited in the stems of the host plant by the hibernated adults in April and May and hatch in five to eight days. When full grown the larvæ pupate in small round earthen cocoons just beneath the surface of the ground, the time from egg to adult being six to seven weeks. They mainly attack plants going to seed in their second year and therefore seem to prefer wild cruciferous plants like hedge-mustard, shepherd's purse and peppergrass to the cultivated forms, as they can be more readily found in second-year growth. One remedy recommended is the utilization of such wild plants as a trap crop near or around the plots on which the cultivated ones are growing, and the pulling up and destroying of the wild plants after the eggs are deposited. Spraying the larvæ and adults with Paris green or other arsenical will also prove effective.

694 (11,077). CEUTORHYNCHUS SULCICOLLIS Payk., 1800, 217.

This species, also introduced from Europe, greatly resembles *rapæ*, but is broader, and the scales are brown instead of grayish-white. Length 3 mm.

Specimens were found at Plummer's Island and Montgomery Co., Md., June 21 and July 1, 1915, by Ernest Shoemaker. It is mentioned by Chittenden (1900, 51) as the "cabbage-gall weevil," an important enemy of cultivated plants of the mustard family in Europe. *C. cyanipennis* Thoms. (not Germar) is a synonym.

685 (——). CEUTORHYNCHUS QUADRIDENS Panz., 1796, 13.

Elongate, subtrapezoidal. Black, above irregularly clothed with elongate dirty white scales intermixed with coarse hair-like bristles; beneath more densely clothed with oval pale yellowish or whitish scales; antennæ, tarsi and post-ocular lobes, pale reddish-brown; basal sutural spot white. Beak and antennæ nearly as in *rapæ*. Thorax one-half wider than long, narrowed and constricted as in that species; disc with two distinct tubercles each side the dorsal channel, which is deep before and behind but interrupted at middle. Elytra as in *rapæ*; intervals wide, flat, marked with a row of fine punctures, each bearing an erect whitish seta. Length 2.5—2.7 mm.

Recorded in this country only from Nantucket, Mass., and Long Island, N. Y., possibly only from one invasion. Redescribed by Dietz under the name *C. seriesetosus*, but shown by Chittenden to be the European *C. quadridens*. Known as the "seed-stalk weevil," the larvæ, according to Chittenden (1900, 51), feeding in the roots of rape and in the seed stalks of horse-radish, cabbage, mustard, etc.

The late M. V. Slingerland (Bull. 78, Cornell Univ. Agr. Exp. Sta., 1894) first mentioned this species as the "seed-stalk weevil" and as damaging fields of seed cabbage on Long Island. The larvæ, many in a single stalk, burrow in the pith of the seed-stalk and its main branches, finally causing the plant to wilt and break over just before the seed begins to mature. At the end of June or early July pupation takes place in earthen cells near the base of the stalk a little below the surface. The species was not recognized by Dr. Horn, to whom it was sent for identification, but later (1901) was identified for Slingerland by Chittenden, the identification being confirmed by Schwarz.*

686 (——). CEUTORHYNCHUS MARGINATUS Payk., 1792, 27.

Short-oval, moderately convex. Black, opaque, densely clothed above with brownish appressed hairs and a few white scales, the latter arranged in a single row in each stria and condensed to form a conspicuous, oblong, sutural white spot immediately behind the scutellum and a few minute clusters near the front margin on either side of thorax; tarsi reddish-brown; beneath densely clothed with white scales. Thorax transverse, deeply constricted in front, apical margin elevated; disc without tubercles or median channel and small acute lateral tubercles, coarsely and densely punctured, densely punctured. Elytral striæ narrow, intervals wider, flat. Hind femora strongly, the front pair very feebly toothed; claws with a long, almost bifid tooth. Male with a large, oval, transverse impression on last ventral segment. Length 3—3.2 mm.

An introduced European species, numerous examples of which have been taken at Ithaca, N. Y., March 12—July 21; also at Framingham, Mass., and Cincinnati, O., (the *scricans* of Dury's list). Found on lettuce and reared from buds of dandelion by Herrick.

687 (8839). CEUTORHYNCHUS SULCIPENNIS Lec., 1876, 274.

Broadly ovate, robust. Black, shining, very thinly clothed above with fine pale pubescence; beneath coarsely and rather closely punctured, each puncture bearing an oval whitish scale; antennæ, tibiæ and tarsi piceous; elytra with an elongate sutural spot of white scales. Beak as long as head and thorax, curved, cylindrical, finely punctured and striate in male, smooth on apical half, female. Eyes only partially concealed by the very small ocular lobes. Thorax slightly wider than long, sides strongly rounded, widely, not deeply constricted near apex; disc with distinct dorsal channel but with a deep, oblong fovea at base, the surface finely and Elytra ovate, convex, one-third wider at base than thorax; striæ wide, deep, coarsely punctate; intervals narrow, convex, very rugose. Male with middle and hind tibiæ strongly clawed at tip. Length 2.5—2.7 mm.

*We are indebted to Prof. C. R. Crosby of the Dept. of Entom., Cornell Univ., for copies of Slingerland's mss., field notes (C. U. Exp. No. 455) and letters upon which the above statements are based.

Frequent throughout Indiana, more so southward; taken by sweeping herbage; April 28—Oct. 17. Throughout New Jersey, May—August. Ranges from Canada and New England to Michigan and Kansas, south to Georgia and Alabama.

688 (8840). CEUTORHYNCHUS DECIPIENS Lec., 1876, 275.

Elongate-ovate. Black, very thinly clothed above with pale hair-like scales; a curved line of larger white scales each side of thorax, a conspicuous scutellar spot, an ill-defined spot near base and a common sutural spot at apex of elytra of similar scales; under surface coarsely punctured, sparsely scaly except the thoracic side pieces which are densely clothed with white scales; antennæ and legs pale reddish-brown. Beak as long as head and thorax, strongly punctured, striate, and carinate in basal half. Thorax as long as wide, broadly constricted near apex, sides feebly rounded, disc coarsely and densely punctured, faintly channeled on basal half. Elytra elongate-oval, two-fifths wider at base than thorax, deeply striate; intervals not wider than striæ, convex, rough with acute granules. Last ventral of male with a deep transverse fovea; tibiæ not clawed at apex. Length 2—2.5 mm.

Marquette, Mich., June 27. Recorded, perhaps erroneously, from Orange Mts., N. J. Ranges from Canada and New England to Michigan, south to North Carolina and west to Kansas, Utah, Colorado and California. Resembles very closely the species of *Auleutes*.

GROUP B.

Our nine eastern species of this group have the funicle 7-jointed, first and second joints elongate, third and fourth slender, equal; femora unarmed; male with fifth ventral foveate and middle and hind tibiæ usually clawed at tip.

KEY TO EASTERN SPECIES OF GROUP B.

a. Elytra not wholly black or piceous.
  b. Claws with very small basal tooth, readily overlooked; legs reddish-brown.
    c. Elytra rather densely clothed with small, yellowish-brown scales; form oblong-oval; larger 2.2—2.5 mm. 689. PUSIO.
    cc. Elytra thinly clothed with fine hairs, with spots and lines of scales denser at sides of thorax; form short-oval; smaller, 1.8—2.2 mm. 690. NEGLECTUS.
  bb. Claws simple; elytra with scutellar spot and postmedian stripe of pale scales; length 2—2.5 mm.
    d. Elytra dark reddish-brown, finely pubescent, the white scales large, oval. 691. SQUAMATUS.
    dd. Elytra seal-brown, densely scaly or coarsely pubescent, the white scales narrow, oblong. 692. SICULUS.

aa. Elytra wholly black or piceous, apart from the vestiture.
e. Claws with a basal tooth; (almost bifid in *pauxillus*).
f. Elytra without rows of setæ; legs piceous; larger, 2.7—3 mm.
g. Broadly oval; elytra with a white scutellar spot and sutural line; club oval, acuminate. (Fig. 99, *d.*) 693. OVALIS.
gg. More oblong; elytra with a white scutellar spot, the sutural line indistinct. 694. INTERMEDIUS.
ff. Elytra with rows of setæ; oval, dark, piceous, tibiæ and tarsi paler; smaller, 1.7 mm. 695. PAUXILLUS.
ee. Claws simple; elytra finely pubescent, with a scutellar spot of elongate white scales.
h. Dorsal channel of thorax distinct, entire; last ventral of male with a small rounded fovea. 696. ANTHONOMOIDES.
hh. Dorsal channel of thorax very faint or wanting; last ventral of male with a large, deep, transverse fovea. 697. TRANSVERSUS.

689 (8845). CEUTORHYNCHUS PUSIO Mann., 1852, 355.

Oblong-oval, subdepressed. Dull reddish-brown, antennæ and legs paler; head, under side of body and sometimes the thorax and basal portion of elytra dark piceous; above rather thickly clothed with small, pale brown or grayish-yellow scales, condensed on sides of thorax and near scutellum, those of the under surface somewhat larger and paler. Front broadly concave; beak as long as head and thorax, male, one-fourth longer, female, finely punctured, feebly carinate and scaly toward base. Thorax one-half wider than long, strongly constricted at apex, apical margin elevated, postocular lobes wanting; lateral tubercles small, acute; dorsal channel feebly impressed, disc densely and rather finely punctured. Elytra longer than wide, one-fourth wider at base than thorax, sides subparallel from base to beyond middle, then gradually converging to apex; striæ fine, intervals wide, finely rugose. Claws with a short, acute basal tooth. Last ventral of male with a deep rounded fovea, of female with a circular impression. Length 2.2—2.5 mm.

Newport, R. I.; June 26—July 11. Cape Cod, Truro and Nantucket, Mass. Sitka, Alaska, LeConte collection. Occurs along the ocean beach on the American sea-rocket, *Cakile edentula* Bigel and beneath kelp. *C. hamiltoni* Dietz is a synonym. There has been much confusion over this species. One of the two specimens mentioned by LeConte as having been sent him from Sitka by Prof. Mæklin is at Cambridge, and differs from *C. hamiltoni* Dietz only in having the elytra slightly darker on basal two-thirds. Specimens of the next species, described by Dietz as *pusio* and also specimens of an apparently undescribed species from Kansas, were placed by the side of the true *pusio* bearing the Sitka label, while LeConte had two additional species from the western states also labelled *pusio*. The sea-rocket above mentioned, on which *hamiltoni* is recorded as feeding, occurs on the Pacific as well as the Atlantic coast and also along the Great

Lakes, which will account for the wide distribution of the insect. It will doubtless be found to be a submaritime form occurring only along the shores of the sea and larger lakes. Since the next species also occurs nearly across the continent and has been recorded many times under the name *pusio*, it is impossible to give the accurate distribution of either.

690 (——). CEUTORHYNCHUS NEGLECTUS sp. nov.

Short-oval, convex. Piceous; antennæ, legs, apical margin of thorax and usually the greater part of elytra dull reddish; above thinly clothed with fine brownish pubescence, with spots and lines of larger oval whitish scales, the latter condensed on sides of thorax and in a large faint scutellar spot on elytra; beneath densely clothed with small pale scales. Head densely punctate, the front broadly depressed; beak as long as thorax, male, as head and thorax, female, feebly curved, naked, shining, finely punctured. Thorax one-third wider than long, strongly constricted near apex, postocular lobes small or wanting; front margin with two small, remote cusps; disc densely and finely punctured, lateral tubercles rather large, acute, dorsal channel distinct only at base and apex. Elytra scarcely longer than wide, one-fourth wider at base than thorax, sides broadly rounded from base to middle, then strongly converging to apex; striæ fine, rather deep, closely punctured; intervals wider, slightly convex, transversely rugose. Last ventral of male with a small round deep fovea; of female with a more shallow rounded one. Length 1.8—2.2 mm. (*W. S. B.*)

Frequent throughout Indiana; May 6—June 23; beaten from red-bud, *Cercis canadensis* L., and taken by sweeping. Chester and Hemlock Falls, N. J. Batavia, N. Y.; June 1—July 12. Recorded under the name *pusio* from New England to Colorado, Oregon and British Columbia south to District of Columbia and Missouri, though some of these records doubtless refer to the true *pusio*. The elytra are often, with the exception of a triangular basal area, wholly dull reddish. This is the *C. pusio* of Dietz (nec Mann. and Lec.) It is shorter, more oval and more convex than *pusio*, with the elytra more strongly rounded, the tubercles of thorax more distinct and ventral fovea of male smaller, deeper and more sharply defined. The food plant is probably *Polygonum*.

691 (8846). CEUTORHYNCHUS SQUAMATUS Lec., 1876, 277.

Oval, robust, subdepressed. Uniform dark reddish-brown, apical margin of thorax, antennæ and legs paler; above finely pubescent; thorax with the sides and a median basal spot, and elytra with a large scutellar spot, an interrupted postmedian band and an oblong subapical sutural spot of large oval whitish scales; under surface thickly clothed with similar scales. Beak long, slender, much curved, finely punctured and striate near base, shining towards tip. Thorax one-half wider than long, strongly narrowed

in front, deeply constricted near apex; disc densely and rather finely punctured; dorsal channel entire, feebly impressed, lateral tubercles small, acute. Elytra one-fourth wider at base than thorax, sides rounded and narrowed towards tip; striæ wide, deep, with coarse, close-set punctures; intervals wider, slightly convex, rugose. Last ventral of male with a deep transverse oval impression. Length 2.2—2.5 mm.

The type in the Cambridge collection is from Illinois. Recorded also from District of Columbia, Iowa and Kentucky.

692 (——). CEUTORHYNCHUS SICULUS Dietz, 1896, 446.

Oval, rather convex. Uniform seal-brown, antennæ and legs rufo-testaceous; beneath clothed with small whitish scales, denser on sternal side pieces; above clothed with coarse, dark brown scale-like hairs intermixed with larger white oblong scales, the latter condensed on sides of thorax and on elytra forming an oblique interrupted line from humerus to suture, also a short basal sutural line and a less distinct post-median band. Beak as long as thorax, male, head and thorax, female, finely carinate, densely and finely punctate. Thorax at base one-third wider than long, strongly narrowed to and feebly constricted near apex; disc finely and densely punctate, the lateral tubercles small, acute. Elytra oblong-oval, sides broadly, feebly rounded; striæ narrow, finely punctate; intervals finely granulate. Last ventral of male with a transverse oval fovea. Length 2—2.3 mm.

Dearborn Co., Ind., rare; August 6. Known also from Ohio, Virginia and District of Columbia.

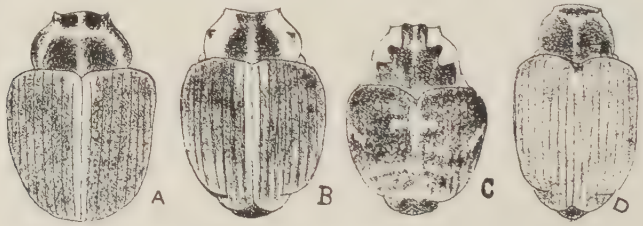


Fig. 103. A, *Ceutorhynchus ovalis* Dietz; B, *Ceutorhynchus semirufus* Lec.; C, *Cœlogaster zimmermanni* Gyll.; D, *Perenthis vestitus* Dietz. (After Dietz.)

693 (——). CEUTORHYNCHUS OVALIS Dietz, 1896, 438.

Oval, convex. Dark piceous; above thinly clothed with fine brownish hairs and large oval scattered white scales, the latter condensed to form a median line and a large spot each side on thorax and a scutellar spot and sutural line on elytra; under surface thickly clothed with similar scales which are crowded on the sternal side pieces. Beak rather stout, curved, finely striate and punctate, smoother toward apex. Thorax wider than long, narrowed from the base, sides broadly rounded; postocular lobes prominent, almost covering the eyes in repose; disc without lateral tubercles, closely and finely punctate, the dorsal channel entire, deeper near base. Elytra nearly one-third wider at base than thorax; striæ fine, each with a

row of minute scales concealing the punctures; intervals wide, flat, rough. Length 2.7—3 mm. (Fig. 103, A.)

Edgebrook, Ill., May 6. Described from Illinois and Minnesota. A compact handsome species, the elytra reflecting a purplish tinge. "Readily recognized by its size, oval, convex form and conspicuous sutural vitta." (*Dietz.*)

694 (——). CEUTORHYNCHUS INTERMEDIUS Dietz, 1896, 438.

Oblong, somewhat depressed. Black, above clothed with small white and pale brown scales, intermixed with scattered large white ones, the latter condensed in an ill-defined scutellar spot, and extending along the sutural interval and on the sides toward apex; the small white ones in a single row alternating with a double row of the brown ones on the other intervals; under surface densely covered with large dirty gray scales. Beak shining almost throughout, finely punctate and scaly near base. Thorax one-third wider at base than apex, where it is broadly and strongly constricted; disc coarsely punctured. Elytral intervals flat, rugose, each with one or two rows of small suberect scales. Length 2.7 mm.

Described from Pennsylvania. Type in the Horn collection.

695 (——). CEUTORHYNCHUS PAUXILLUS Dietz, 1896, 442.

Narrowly suboval, convex. Dark piceous, above sparsely clothed with pale scales; beneath thickly clothed with dirty white ones; tibiæ and tarsi reddish-brown. Thorax twice as wide at base as apex, strongly narrowed in front of middle; disc with rather large acute tubercles, its dorsal channel narrow, ill-defined. Elytral striæ wide, deep, closely punctate; intervals each with a row of stiff, suberect brownish scale-like setæ. Length 1.7 mm.

One in Horn collection from northern Illinois. Known also from New Mexico. Close to *pusillus* Lec. which occurs farther west.

696 (——). CEUTORHYNCHUS ANTHONOMOIDES Dietz, 1896, 444.

Oval, elliptic. Black, shining; above very thinly clothed with fine, whitish pubescence with a few suberect whitish scales and a scutellar spot of larger white ones; antennæ, legs and front margin of thorax reddish-brown; mesosternum and side pieces densely clothed with white scales. Beak rather slender, curved, naked, finely striate and punctured on basal two-thirds; head very coarsely punctured. Thorax at base more than one-half wider than long, ocular lobes distinct; disc densely and rather coarsely punctured, tubercles small, acute, dorsal channel entire. Elytra one-fourth wider at base than thorax, oval, convex, sides broadly rounded; intervals wider than striæ, flat, rugose. Length 2.2—2.5 mm.

Owen and Posey counties, Ind., rare; June 2—15. The type, now in the Ulke collection, was a male from the District of Columbia.

697 (——). Ceutorhynchus transversus sp. nov.

Broadly oval. Dull black, antennæ and legs dark reddish-brown, femora fuscous at middle; surface very finely pubescent, almost without scales except some elongate whitish ones condensed on sides of meso- and metasterna and an indistinct scutellar spot. Beak of male slender, as long as thorax, finely striate, densely punctate throughout. Head densely and coarsely punctate. Thorax at middle one-half wider than long, sides broadly rounded from base to the strong apical constriction; disc coarsely, deeply and densely punctate, the tubercles small, obtuse, dorsal channel very faint. Elytra oval, at the prominent umbones one-third wider than middle of thorax, sides thence converging to the broadly rounded apex; striæ deep; intervals feebly convex, strongly rugose. Fovea of fifth ventral of male deep, transverse, its length nearly one-third the width of the segment. Length 2.5 mm. (*W. S. B.*)

Starke Co., Ind., rare; May 8.

Group C.

Our nine species of this group have the femora unarmed; funicle 6-jointed, joints 1—3 elongate, the outer three short; middle and hind tibiæ clawed in the males; tarsal claws simple. The species of this group occurring in Europe are placed under the generic name *Ceutorrhynchidius*.

KEY TO EASTERN SPECIES OF GROUP C.

a. Elytra not wholly black or piceous.
  b. Elytra bicolored, black, shining in front, reddish or ferruginous behind; sutural line and spot on side of elytra of large white scales. 698. semirufus.
  bb. Elytra not bicolored.
    c. Upper surface more or less scaly; elytra and legs reddish-brown.
      d. Oblong-elliptic; smaller, 1.7 mm. 699. zimmermanni.
      dd. Broadly oval; larger, 2 mm. 700. floridanus.
    cc. Upper surface pubescent; elytra brown, sutural interval and base of second densely clothed with pale scales; length 2—2.4 mm. 701. medialis.
aa. Color of elytra wholly black or piceous, apart from the scales or hairs clothing them.
  e. Upper surface clothed with short, coarse, scale-like hairs; legs black or piceous.
    f. Larger, 2—2.2 mm.; pubescence more depressed; antennæ of male inserted beyond the middle. 702. septentrionalis.
    ff. Smaller, 1.8—2 mm.; pubescence less appressed; antennæ of male inserted behind the middle. 703. puberulus.
  ee. Upper surface finely pubescent, more or less shining.
    g. Larger, 2—2.3 mm.; thorax finely and evenly punctured.
      h. Legs red; fourth tarsal joint long. 704. erythropus.
      hh. Legs blackish; fourth tarsal joint shorter, projecting less than length of third joint. 705. morosus.

gg. Smaller, 1.7 mm.; thorax coarsely unevenly punctured; legs black, 706. ATRICULUS.

698 (8850). CEUTORHYNCHUS SEMIRUFUS Lec., 1876, 278.

Oval, elliptic. Piceous-brown; antennæ, legs, thorax in part, and apical fourth to two-thirds of elytra pale reddish-brown, shining; above very thinly clothed with short fine pubescence and large scattered whitish scales, the latter condensed to form a sutural line and oblong lateral spot on elytra and a median line and spot each side of thorax; under surface densely clothed with similar scales. Beak curved, as long as head and thorax, striate near base, punctured toward tip. Thorax one-third wider than long, sides rounded; disc narrowed and constricted in front, coarsely not closely punctate, apical margin elevated, ocular lobes broad; dorsal channel deep in front and behind, lateral tubercles prominent, acute. Elytra convex, one-fourth wider at base than thorax, distinctly longer than wide, their sides broadly rounded and narrowed from base to apex; striæ with close-set punctures; intervals flat, shining, finely punctate. Length 1.8—2 mm. (Fig. 103, B.)

Steuben and Lake counties, Ind., scarce; May 9—May 27. Beaten from flowers of tall huckleberry, *Vaccinium corymbosum* L. Edgebrook, Ill., May 6. Rare in New Jersey. Batavia and Portage, N. Y., May 17—24. Ranges from New England and Canada west to Michigan and Illinois. The reddish portion of elytra, like that of *neglectus*, varies greatly in shape and area, sometimes leaving only a small triangular scutellar spot blackish. Readily known by its form, and parti-colored elytra with white sutural line.

699 (8853). CEUTORHYNCHUS ZIMMERMANNI Gyll., Schön., 1837, 492.

Oblong-oval. Dark reddish-brown to piceous; antennæ and legs pale reddish-brown; above thinly clothed with white, oval scales, mixed with a suberect scale-like pubescence; beneath densely clothed with whitish scales; an elongate, not well defined scutellar spot of large pale scales. Beak as in *septentrionalis*. Thorax short, wider than long, broadly constricted at apex, ocular lobes prominent; tubercles very small, acute, dorsal channel feeble, more distinct at base. Elytra oblong, one-fifth wider at base than thorax, sides very broadly curved, tubercles on humeri and apical fourth distinct; striæ fine, punctured; intervals flat, shining, rugose. Length 1.5—1.8 mm.

Kosciusko, Clark and Perry counties, Ind., scarce; May 5—June 24. Taken by sweeping herbage in low damp places. Recorded from New Jersey and West Point, N. Y. Black Mountains, N. C., June 20 –July 14. Ranges from New England and Canada to Colorado and Texas. Easily know by its small size and nearly uniform brown color.

700 (——). CEUTORHYNCHUS FLORIDANUS sp. nov.

Broadly oval. Dark reddish-brown, somewhat paler and more evidently red at apex of elytra and beneath; with sparse rounded white scales, condensed about the scutellum and along the apical third of the suture, and forming a vague spot toward apex, but involving neither apex, suture nor margin. Thorax coarsely, confluently punctate, median channel feebly impressed and abbreviated in front, sides arcuate, lateral tubercles of disc small but acute at summit. A few rounded white scales feebly indicate the lateral stripes seen in *semirufus*. Elytra deeply punctate, striate, intervals tuberculate toward apex, punctate; the rounded white scales are more thickly placed on the inflexed portion of the elytra and parts of the body beneath. Legs red and sprinkled with white scales. Resembles *semirufus* in form and size, but differs especially in the darker color and absence of the sutural line of white scales. Length 2 mm. (*C. W. L.*)

Enterprise, Fla., April 11. Kissimmee, Fla., Feb. 16. Specimens associated with the type from Enterprise, April 17, and Mobile, Ala., March 28 (*Loding*), differ only in having the markings of white scales less distinct.

701 (8851). CEUTORHYNCHUS MEDIALIS Lec., 1876, 279.

Oblong-oval, subdepressed. Dull reddish-brown, the thorax slightly darker; above clothed with pale, scale-like hairs; sutural interval and base of second interval densely, sides behind the middle of elytra less densely clothed with dirty white scales; beneath densely clothed with similar scales. Beak as in *semirufus*. Thorax one-third wider at base than apex, finely not closely punctured, the lateral tubercles small, acute. Elytra longer than wide, sides straight and feebly converging to apical fourth; intervals wide, flat, finely rugose. Last ventral of male with deeply impressed apical fovea. Length 2—2.4 mm.

Clark Co., Ind., rare; May 6. Described from Lake Superior. Dietz also records specimens from Louisiana under this name.

702 (8852). CEUTORHYNCHUS SEPTENTRIONALIS Gyll., Schön., 1837, 492.

Oblong-oval. Black, above rather densely clothed with short pale scale-like hairs having a faint brassy lustre; under side more densely clothed with larger dirty white scales, an inconspicuous scutellar spot, often entirely absent, of similar scales; antennæ pale reddish-brown, tibiæ and tarsi piceous. Beak longer than head and thorax, strongly curved, finely striate and punctured on basal third, shining and very finely punctate beyond the middle. Thorax one-third wider than long, narrowed and strongly constricted near apex; disc closely and rather coarsely punctured; dorsal channel distinct only near base and apex; lateral tubercles very small, acute. Elytra about one-third wider at base than thorax, sides broadly rounded from humeri to apex; striæ narrow, feebly punctate; intervals flat, broader, each with two or three irregular rows of brassy scales. Length 2—2.2 mm.

Frequent throughout Indiana; April 25—July 4. Swept in numbers from pepper-grass, *Lepidium virginicum* L., and beaten from dogwood blossoms. Common near New York City, fall to spring, on wild mustard, *Sisymbrium officinale* L. Chittenden records it also as feeding on horse-radish and yellow rocket. Ranges from New England and Canada to Colorado, south to Virginia.

703 (8854). CEUTORHYNCHUS PUBERULUS Lec., 1876, 279.

Smaller and more oblong than *septentrionalis*. Differs mainly in having the scale-like pubescence less appressed; beak longer and more slender, especially in the female; thoracic channel more evenly impressed, not interrupted at middle; antennæ of male inserted before the middle; pygidium more finely punctured. Last ventral of male with fovea occupying middle third, a tubercle-like elevation each side of fovea. Length 1.8—2 mm.

Starke County, Ind., rare; May 18. Occurs in Canada and throughout New Jersey with *septentrionalis* and probably confused with it. Range the same, including Texas.

704 (——). CEUTORHYNCHUS ERYTHROPUS Dietz, 1896, 451.

Oblong-oval. Blackish, legs reddish-brown; above clothed with a fine pubescence, consisting of short, suberect, hair-like scales, and having a faint brassy lustre; beneath not densely clothed with small whitish scales. Antennæ of female inserted beyond the middle. Thorax three-fifths wider than long, sides well rounded, tubercles small, acute; dorsal channel feeble except near base. Fourth tarsal joint very long. Length 2 mm.

Plummer's Island, Md.; U. S. National Museum. Described from a single female in the Ulke collection from District of Columbia.

705 (——). CEUTORHYNCHUS MOROSUS Dietz, 1896, 451.

Black, tibiæ and tarsi piceous. Antennæ of female inserted two-fifths from base. Thorax very densely punctured in its basal half. Otherwise as in *erythropus*. Length 2.2 mm.

Described from a single Virginia specimen now in the Bolter collection at Urbana, Illinois.

706 (——). CEUTORHYNCHUS ATRICULUS Dietz, 1896, 451.

Oblong-oval. Black, antennæ brownish-yellow; above very thinly clothed with fine, scale-like pubescence. Thorax slightly wider than long, sides broadly rounded, shallowly constricted near apex, dorsal channel obscure; disc coarsely, rather closely punctate. Elytra oblong, their sides nearly parallel. Length 1.7 mm.

Known only from Pennsylvania and District of Columbia.

Subtribe IV. Phytobii.

Stout robust species of medium size, having the beak short and stout, its antennal grooves usually oblique, directed beneath the eyes; pectoral groove either wanting or not reaching the front coxæ; eyes, except in *Cælogaster*, not concealed in repose; funicle 6-jointed, except in *Rhinoncus*. The species of the last two genera are notable for their velvet-like vestiture.

KEY TO GENERA OF SUBTRIBE PHYTOBII.

a. Eyes in repose completely concealed by prominent thoracic lobes; beak as long as thorax, its antennal grooves directed against the eyes. XI. Cœlogaster.

aa. Eyes feebly or not at all concealed in repose, the postocular lobes small or obsolete; beak shorter than thorax, its grooves oblique, directed beneath the eyes.

b. Third tarsal joint bilobed, fourth joint shorter than the two preceding united.

c. Second ventral segment not longer at middle than the third and fourth combined, third narrowed at each end; front coxæ widely separated; form broadly oval. XII. Perigaster.

cc. Second ventral segment longer at middle than the two following united, third not narrowed on the ends; front coxæ narrowly separated.

d. Prosternum without antecoxal ridges. XIII. Pelenomus.

dd. Prosternum with acute antecoxal ridges.

e. Funicle 6-jointed; eyes with distinct supra-orbital ridges; front coxæ separated one-third the distance of the middle coxæ. XIV. Mecopeltus.

ee. Funicle 7-jointed; eyes without supra-orbital ridges; front coxæ separated one-half the distance of the middle coxæ XV. Rhinoncus.

bb. Third joint of tarsi narrow, not or scarcely bilobed, fourth as long as the preceding joints united (Fig. 99, *f*); form elongate-oval; lateral tubercles of thorax almost obsolete.

f. Base of thorax not prolonged backwards. XVI. Perenthis.

ff. Base of thorax prolonged backward with acute triangular process. XVII. Phytobius.

XI. Cœlogaster* Schön., 1837. (Gr., "large" + "belly.")

Beak moderately stout, as long, male, or a little longer, female, than thorax; pectoral canal deep, not extending on mesosternum; second ventral shorter than the third and fourth united, third narrowed at each end; coxæ widely separated; femora not

*Champion (1907, 151) has proposed the name *Dietzella* for this genus, claiming that American species are not true Cœlogasters, but further study of European species is required before adopting the change. If the change is made *Dietzella* should probably be referred to the subtribe *Cœliodes*.

toothed; third tarsal joint broadly bilobed; claws armed with a slender tooth, almost as long as the claw itself.

KEY TO SPECIES OF CŒLOGASTER.

a. Dorsal channel of thorax entire; disc with an obtuse tubercle each side near middle above and in front of lateral tubercles; antecoxal ridges distinct. 707. ZIMMERMANNI.

aa. Dorsal channel interrupted at middle; disc without obtuse tubercles; antecoxal ridges obsolete. 708. LITURATUS.

707 (8860). CŒLOGASTER ZIMMERMANNI Gyll., Schön., 1837, 589.

Broadly oval, robust. Piceous, variegated above with spots of yellowish-white scales, condensed on sides and near apex of thorax and forming on elytra a cruciform scutellar spot and a short oblique bar each side; beneath densely clothed with large oval white scales; antennæ, tibiæ and tarsi reddish-brown. Beak thinly pubescent except near tip, finely striate, coarsely and densely punctate. Thorax not much wider than long, broadly constricted near apex, lateral tubercles acute, apical cusps well marked, triangular; disc densely, not coarsely punctate. Elytra one-third wider at base than thorax, humeri rounded; striæ fine, their punctures very small; alternate intervals distinctly more convex. Length 3—3.2 mm. (Fig. 103, C.)

Martin and Perry counties, Ind., scarce; May 16—July 13. South Orange and Alpine, New Jersey. Flatbush and White Plains, N. Y.; June 12—July 25. Ranges from Canada and Newfoundland to Michigan and Washington, south to Georgia. Recorded as occurring on beggar's ticks, *Bidens*, and on swamp herbage.

708 (——). CŒLOGASTER LITURATUS Dietz, 1896, 457.

Smaller and more oblong than the preceding. Differs by characters given in key and by having the thorax one-fourth wider than long, not distinctly constricted near apex, its surface much less uneven. Elytral intervals equal, the transverse pale bar of scutellar spot faint and somewhat oblique, the short bar represented by a spot on seventh interval; prosternum very deeply emarginate. Length 2.7 mm.

Lake Co., Ind., rare; April 29. Ottawa, Canada, New Hampshire and Massachusetts; Leng and Cambridge collections. Dietz's types were from Illinois and near Detroit, Mich.

XII. PERIGASTER Dietz, 1896. (Gr., "round" + "belly.")

Short, robust species, distinguished by characters given in key and by having the beak stout, shorter than thorax; eyes large, round, scarcely concealed in repose; thorax strongly narrowed in front, its apical margin with two cusps and disc with two tubercles; elytra broadly oval, wider at base than thorax; coxæ widely separated; tarsal claws simple, diverging. Two species are known

which are subaquatic in habits, feeding mainly upon plants of the genus *Ludwigia*.

KEY TO SPECIES OF PERIGASTER.

a. Dorsal channel of thorax impressed only at base; elytra not mottled with white. 709. CRETURA.

aa. Dorsal channel entire but feeble; elytra mottled with white. 710. OBSCURA.

709 (8861). PERIGASTER CRETURA Herbst, 1797, 70.

Broadly oval. Brownish-black, very thinly clothed above with small pale or brownish scales; beneath densely clothed with pale brownish-yellow scales, the last three segments less densely scaly; antennæ and legs reddish-brown. Head broadly impressed between the eyes; beak subcarinate, punctured, pubescent, as long as the head. Thorax one-half wider than long, lateral tubercles acute, disc finely and densely punctured. Elytra with sides broadly rounded, feebly converging behind; striæ rather deep, wide, punctured; intervals densely and finely rugose, feebly convex. Length 2.7—3 mm.

Lake and Dubois counties, Ind., scarce, probably throughout the State. May 12—Sept. 19; from flowers of golden-rod on the latter date. Caldwell, N. J.; Flatbush and Rockaway, N. Y., June 20—July. Black Mountains, N. C., June—July. Dunedin, Fla., Jan. 24—Mch. 22. Ranges from Ontario and New England to Michigan and Iowa, south to Florida and Texas. Pierce (1916) states that in Texas it breeds externally on the leaves and stems of *Ludwigia natans* Ell. The larvæ are yellow and have a gliding motion. They spin a silken thread with which they form a covering while they eat, working mainly under water. The pupal cell is composed of silk and a dark substance impervious to water. The adult is saltatorial.

710 (8862). PERIGASTER OBSCURA Lec., 1876, 283.

Resembles *cretura* in form but slightly smaller. Reddish-brown to piceous; elytra with a small but conspicuous white spot in front of middle on third interval, another near apex and smaller ones scattered irregularly on sides; antennæ and legs paler reddish-brown. Head strongly punctured, concave. Beak very stout, as long as head, finely punctate. Thorax more coarsely punctured than in *cretura*, each puncture bearing a small yellowish scale. Striæ of elytra deeper, more closely punctured; intervals distinctly more convex. Length 2.5—2.8 mm.

Dunedin, Enterprise and Lake Istokpoga, Fla., Jan. 19—Dec. 28. Frequent in winter beneath boards along the border of ponds and lakes. Recorded only from Georgia and Florida.

XIII. Pelenomus Thomson, 1860.

(Gr., "monstrous" + "shoulder.")

Beak short, stout, more or less widened toward tip; eyes round, strongly convex, completely uncovered in repose; thorax wider than long, narrowed in front, without ocular lobes, its front margin with two prominent suberect cusps or teeth, which, with the two lateral tubercles, cause it to appear 4-tuberculate when viewed from above; elytra oval, wider at base than thorax; middle and hind coxæ widely separated; claws with a short acute tooth, overlooked by LeConte and Dietz, according to Champion. Six of the eight known species occur with us.

KEY TO EASTERN SPECIES OF PELENOMUS.

a. Antennæ more slender, second and third joints of funicle distinctly longer than those which follow. (Fig. 99, *e.*) 711. SULCICOLLIS.

aa. Antennæ stouter, joints 2 and 3 of funicle very little longer than those which follow.

v. Elytral intervals, especially those on sides, each with a row of acute granules; front concave; dorsal channel of thorax feeble or wanting.

c. Scales of upper surface brown with a brassy tinge; second ventral of male with a large yellowish elevated semicircular scale on its front margin. 712. ASPERULUS.

cc. Scales of upper surface uniform grizzly-gray, without brassy tinge; male without ventral scale as above. 713. GRISEUS.

bb. Intervals without granules; front not concave.

d. Dorsal groove of thorax distinct; male with ventral segments 2—4 unmodified.

e. Beak rather slender, as long as head; fourth tarsal joint shorter than the two preceding. 714. SQUAMOSUS.

ee. Beak stout, shorter than head; fourth tarsal joint as long as the two preceding. 715. PUSILLUS.

dd. Dorsal groove represented by a shallow postapical impression; ventrals 2—4 of male with a broad, shallow, pubescent median impression. 716. IMPRESSIVENTRIS.

711 (8857). Pelenomus sulcicollis Fahr., Schön., 1843, 346.

Broadly oval. Dark piceous, clothed with brown scales having a brassy tinge and variegated with pale ones, the latter condensed on the sides and on basal half of dorsal channel of thorax and forming on the elytra a small post-scutellar and numerous smaller subquadrate spots; antennæ and legs reddish-brown. Beak scarcely longer than head, widened toward apex, densely and finely punctate. Thorax nearly twice as wide at base as long, dorsal channel entire, widening into a fovea in front; lateral tubercles acute, disc finely and closely punctured. Elytra one-fourth wider at base than thorax, sides broadly rounded, striæ punctured; intervals feebly convex, the alternate ones slightly more so. Length 2.3—2.5 mm.

Frequent throughout Indiana; April 17—August 19; also throughout New Jersey on smartweed, *Polygonum*, in low ground; April—August. Occurs at Ottawa, Canada, and throughout the United States east of the Rocky Mountains, south to Georgia and Alabama.

712 (——). PELENOMUS ASPERULUS Dietz, 1896, 464.

Form of *sulcicollis* but smaller. Above nearly uniformly clothed with grayish-brown scales, the white ones of elytra very few, forming indistinct spots and bands. Second and third joints of funicle equal. Head deeply concave between the eyes. Thorax with lateral tubercles small, acute, its dorsal groove almost obsolete. Intervals of elytra feebly convex, the alternate ones more strongly so, finely rugose, each with a row of very small, acute granules, more evident on sides than disc. Second ventral of male, with a round and rather deep impression, bordered in front by a pale, elevated pubescent scale or margin. Length 2—2.3 mm.

Lake, Posey, Clark and Perry counties, Ind., rare; April 22—May 19. Known elsewhere only from Massachusetts, southern Illinois and Detroit, Mich. Differs from *sulcicollis* by its smaller size, less distinct dorsal channel and by the peculiar margined impression of second ventral of male.

713 (——). PELENOMUS GRISEUS sp. nov.

Rather narrowly oval, convex. Black, everywhere thickly and uniformly clothed with grizzly-gray scales; elytra with a small oblong post-scutellar spot of white scales; tibiæ and basal joints of antennæ reddish-brown; club, tarsi and middle of femora more or less fuscous. Beak longer than head, rather slender, finely and densely punctate, scaly except near tip; second and third joints of funicle subequal, slightly longer than 3—6. Thorax with disc narrower than in *sulcicollis*, its apical cusps and lateral tubercles prominent, acute, dorsal channel represented by a deep concavity between the cusps and a small impression at base. Elytra more than one-third wider at base than thorax, humeri rounded, sides subparallel to apical third, then broadly rounded to apex; striæ very fine; intervals feebly convex, the outer five or six each with a row of obtuse granules. Fourth joint of tarsi longer than second and third united. Length 2.4 mm. (*W. S. B.*)

Type in Blanchard collection at Cambridge, labelled "Mass.," also "*Pelenomus* sp. nov." in his handwriting. Very distinct by the uniform gray vestiture and narrow disc of thorax as above described.

714 (8858). PELENOMUS SQUAMOSUS Lec., 1876, 281.

Smaller than *sulcicollis*. Black, above densely clothed with grayish-white and brown scales, the former covering the sides of thorax and forming distinct mottlings on elytra; beneath clothed with paler scales; antennæ and legs pale reddish-brown. Beak scarcely longer than head, stout,

cylindrical, densely and finely punctured; eyes convex, prominent; head densely punctured, not impressed. Thorax wider than long, much narrowed in front; apical cusps small, acute, rather distant; lateral tubercles acute, rather large; dorsal channel not deep. Elytra with deep, slightly punctured striæ; intervals nearly flat, very finely rugose. Length 2—2.2 mm.

Detroit, Mich., May 31; U. S. Nat. Mus. Coll. Not common near New York City in June, July and September. Recorded also from Idaho and British Columbia.

715 (——). Pelenomus pusillus Dietz, 1896, 466.

Differs from *squamosus* in having the "beak very stout, shorter than head; eyes less convex. Scales on upper surface brownish with a brassy lustre and more conspicuously mottled with larger white scales; scales of under side ochreous, legs rufous, fourth tarsal joint longer, nearly equal to the two preceding joints. Last ventral of male with a small longitudinal fovea. Length 2 mm." (*Dietz.*)

Known only from a single specimen in the Horn collection, from Tampa, Fla.

716 (——). Pelenomus impressiventris sp. nov.

Short-oval, subdepressed. Black or piceous, above rather thickly clothed with reddish-brown scales, having a faint brassy tinge; elytra more or less mottled with small patches of elongate pure white scales; under surface rather thinly clothed with oval or rounded white scales, those on sides of thorax and sternal side pieces yellowish. Beak stout, as long as head, finely and densely punctate. Thorax one-half wider at base than long, disc finely and densely punctate, less narrowed in front than in *squamosus*, its apical margin not emarginate between the cusps which are quite small and widely separated; lateral tubercles also small, acute. Elytra one-third wider at base than thorax, humeri rounded, sides subparallel or feebly converging to apical third, then broadly rounded to apex; intervals feebly convex, the fifth slightly more elevated. Ventral segments 2—4 of male as described in key, the fifth with a deeper transverse impression. Length 1.8—2 mm. (*W. S. B.*)

Lake Co., Ind., rare; Sept. 14. Tyngsboro, Mass., Oct. 2, Blanchard collection. Smaller than the other species, with apical cusps and tubercles less prominent and sexual characters of the male very distinct.

XIV. Mecopeltus Dietz, 1896. (Gr., "long"+ "skin.")

Differs from *Pelenomus* only in the presence of ante-coxal ridges, forming a prosternal canal for the reception of the rostrum in repose. The antennal club is large, the first joint forming half of its mass; other characters as given in the key. In general appearance they do not differ from *Pelenomus*. Two of

the six species occur with us, but are rare in collections examined.

KEY TO EASTERN SPECIES OF MECOPELTUS.

a. Front concave; scales without lustre, dull. 717. FULIGINOSUS.
aa. Front not concave; scales with brassy lustre. 718. SCANDENS.

717 (——). MECOPELTUS FULIGINOSUS Dietz, 1896, 467.

Oval. Pitchy-black; above thinly clothed with grayish scales, faintly mottled with whitish ones and pale pubescence; beneath more densely clothed with grayish scales; sides of thorax densely clothed with dirty yellowish scales; antennæ and legs reddish-brown. Beak longer than head, gradually widening from base to tip, densely punctate, each puncture bearing a fine scale. Thorax one-half wider than long, sides rounded in front of middle; apical cusps and lateral tubercles large and acute, dorsal channel entire, expanding near apex into a triangular impression; disc densely and finely punctate. Elytra oval, one-third wider at base than thorax, sides broadly rounded; striæ with close-set punctures; intervals feebly convex, the outer ones each with a row of minute, acute granules bearing short recurved setæ. Length 2.7—3 mm.

Recorded from Newark, N. J. Ranges from New England and Canada to Oregon, south to Texas. "Resembles *Pelenomus sulcicollis*, but larger, more sombre and has the ante-coxal ridges.* (*Dietz.*)

718 (——). MECOPELTUS SCANDENS Dietz, 1896, 467.

Oval, elliptic. "Black, antennæ and legs ferruginous; above thinly clothed with small pale brown scales, mottled with small spots of white scales and mixed with a fine pubescence having a brassy lustre; under side more densely clothed with grayish scales; sides of thorax with yellowish ones; sutural interval of elytra with grayish white velvety scales interrupted by a darker spot behind the scutellum. Elytra with sides distinctly converging from near humeri to apex; antecoxal ridges less marked than in the preceding. Otherwise much as there. Length 2.2—2.5 mm."

Nelson Co., Va., June 23. Recorded also from Anglesea, New Jersey, July 12. Described from a single male in the Horn collection labelled "Camb." Occurs on primrose. (*Robinson.*)

XV. RHINONCUS Schön., 1837. (Gr., "nose" + "swelling.")

Robust oval or oblong-oval species, having the beak short, stout, widened toward tip; eyes large, convex, wholly visible in repose; funicle 7-jointed, the basal joint long, obconic, second longer than third, the others short, subrotund; prosternum long in front of the coxæ, the antecoxal ridges distinct; coxæ widely separated; legs slender, femora unarmed, third tarsal joint bilobed, claws cleft or armed with a long tooth. The three known

*These ridges, which are very plain in *Rhinoncus* and in some western species of *Mecopeltus*, are only short, acute, elevations in this species, and easily overlooked.

North American species occur with us. All have a conspicuous scutellar spot of white or pale scales.

KEY TO SPECIES OF RHINONCUS.

a. Beak longer than head; thoracic tubercles obvious but small; form stout, broadly oval.

b. Larger, 3.5—4 mm.; elytra not mottled nor tuberculate. 719. PERICARPIUS.

bb. Smaller, less than 3 mm.; elytra mottled, the intervals finely tuberculate. 720. PYRRHOPUS.

aa. Beak not longer than head; thoracic tubercles wholly wanting; form more slender; length 2.1—2.8 mm. 721. LONGULUS.

719 (8863). RHINONCUS PERICARPIUS Fab., 1801, 451.

Broadly oval, robust. Dark reddish-brown to blackish, antennæ and legs paler; above very thinly clothed with coarse grayish-yellow prostrate hairs, beneath rather densely clothed with dirty gray scales; scutellar spot elongate-triangular, very conspicuous. Beak slightly longer than head, very finely carinate, closely and coarsely punctate. Thorax one-half wider than long, feebly constricted near apex, disc coarsely and closely punctured, feebly channeled, its lateral tubercles very small, obtuse. Elytra about one-fourth wider at base than thorax, humeri rounded, sides broadly curved; striæ wide, rather deep, closely and coarsely punctate; intervals feebly convex, very rugose. Length 3.5—4 mm.

Throughout Indiana but scarce; May 21—July 8. Taken in numbers from the axils of the leaves of the soapwort or bouncing-bet, *Saponaria officinalis* L., on May 29. Staten Island, N. Y., and Jamesburg, N. J., July 11. Ranges from Canada, New England and Lake Superior south and southwestward. Collected on *Euphorbia marginata* Pursh. at Clarendon, Texas, August 11; occurs also on *Polygonum*.

This is a common European species to which Dr. Dietz gave the name *occidentalis* because of minor differences in the carina of beak, the curved impression at its base and in the longer fourth tarsal joint. The carina of beak is interrupted and almost obsolete in several specimens at hand and the basal impression is also variable. As pointed out by LeConte, Say described the species under the name *Ceutorhynchus triangularis*, and his name must be restored if the insect proves to be different from the European form.

720 (8864). RHINONCUS PYRRHOPUS Boh., Schn., 1845, 172.

Broadly ovate. Piceous-brown, thickly clothed above with coarse brownish hairs and white scales; the latter forming a conspicuous scutellar spot, behind which is a dark velvety line, and numerous mottlings on elytra; under surface and flanks of thorax densely clothed with whitish

scales; antennæ and legs pale reddish-brown. Beak scaly at base, shining on apical half, finely and sparsely punctate; front concave between the eyes. Thorax one-third wider than long, broadly and shallowly constricted near apex, disc coarsely and densely punctate; dorsal channel distinct only on basal half, lateral tubercles small, acute. Elytra one-fourth wider at base than thorax, sides broadly rounded; strial punctures small, rather distant; intervals convex, rugose, each with a row of small inclined tubercles. Last ventral of male with a small glabrous space at apex, middle and hind tibiæ clawed at tips. Length 2.3—2.7 mm.

Common on dock throughout Indiana; hibernates as imago; Jan. 7—July 10. Throughout New Jersey, May—August, feeding on *Rumex*. Recorded from New England and Ottawa, Canada, west to Colorado and southwest to Texas. Occurs mainly on different species of dock (*Rumex*); breeds also on smartweed, *Polygonum pennsylvanicum* L. and *Euphorbia marginata* Pursh. Confused in some collections with *Centorhynchus decipiens*, but easily separated by its short beak and unarmed femora.

721 (8865). Rhinoncus longulus Lec., 1876, 284.

Oblong-oval. Dark reddish-brown or piceous, antennæ and tarsi paler; above very thinly clothed with very short, fine pubescence, intermixed with isolated elongate white scales; sides and dorsal channel of thorax, scutellar spot of elytra and small sutural spot on declivity densely clothed with white scales. Beak very stout, shorter than head, densely and coarsely punctured. Thorax as wide as long, slightly narrowed in front, sides feebly rounded; disc coarsely and densely punctured, its dorsal channel confined to basal half. Elytra one-fourth wider at base than thorax, striæ deep, distinctly punctured, intervals flat, densely rugose. Length 2.5—2.8 mm.

Lake, Kosciusko, Knox and Lawrence counties, Ind., scarce; probably throughout the State; April 29—Sept. 2. Orange Mts., N. J. Ithaca, N. Y., June. Black Mountains, N. C., Sept. 20. Ranges from New England to Illinois, south to Florida. Occurs on *Polygonum*, eating round holes in leaves.

XVI. Perenthis Dietz, 1896.

In addition to characters of key the single species has the beak stout, widened toward tip; funicle 6-jointed, joints 2 and 3 little longer than wide, 4—6 wider than long; middle coxæ three times as widely separated as the front ones; legs slender, femora unarmed, not club-shaped, claws simple.

722 (——). Perenthis vestitus Dietz, 1896, 460.

Elongate-oblong. Black, above densely clothed with dark gray and paler scales intermixed, the vestiture having a faint bluish reflection; sides of thorax and under surface closely and uniformly clothed with

grayish-white scales; elytra with a distinct elongate post-scutellar spot of white scales. Beak and head densely and finely punctate, thinly clothed with small oval scales. Thorax about one-half wider than long, feebly constricted near apex, dorsal channel entire, disc finely and closely punctured. Elytra one-third wider at base than thorax, sides subparallel, striæ rather wide, not deep, their punctures concealed by the scales; intervals wide, feebly convex. Length 2.5 mm. (Fig. 103, D.)

Ft. Monroe, Va., April 19. Thalman, Ga., April 28. Described from a single Indiana specimen without definite locality. "Easily recognized by its elongate form, very dense scaly vestiture and very small lateral thoracic tubercles." *(Dietz.)* In form and appearance it resembles *Phytobius*, the dense overlapping scales suggesting that, like that genus, it is semiaquatic in habits.

XVII. PHYTOBIUS Schn., 1836. (Gr., "plant" + "living.")

Beak stout, cylindrical, nearly as long as thorax; eyes small, rounded, convex, fully exposed; base of thorax prolonged backwards into an acute triangular process; prosternum without antecoxal ridges; legs long, slender, femora unarmed; tarsi narrow, third joint not or feebly bilobed (Fig. 99, *f.*); claws simple. Two species occur in our fauna.

KEY TO NORTH AMERICAN SPECIES OF PHYTOBIUS.

a. Thorax at base one-half wider than long, narrowed in front; mesosternal side pieces visible from above; surface covered with a dense layer of overlapping scales forming a waterproof covering as in *Bagous*. 723. GRISEOMICANS.

aa. Thorax very little wider than long, scarcely narrowed at apex; mesosternal side pieces not visible from above; scales of upper surface not overlapping. 724. VELATUS.

723 (11,079). PHYTOBIUS GRISEOMICANS Schwarz, 1891, 165.

Oval. Pitchy-black, above densely clothed with grayish slate-colored scales having a peculiar velvety appearance; antennæ and legs reddish-yellow; under surface with larger, less densely placed white or yellowish scales; elytra often with a large heart-shaped scutellar spot of similar scales; apical edge of elytra reddish. Beak slightly longer than thorax, feebly curved, finely and densely punctate, scaly near base. Thorax feebly constricted near apex, the apical cusps very small; lateral tubercles distinct, acute; disc densely and finely granulate-punctate, its dorsal channel entire. Elytra two-fifths wider at base than thorax, humeri rounded, prominent, sides straight to beyond middle, then rounded to tips; striæ wide, punctate; intervals convex, the fifth strongly so on basal half. Tarsi as long as the tibiæ, without swimming hairs. Length 2.2—3 mm.

Known from Ottawa and Quebec, Canada, Wisconsin, Iowa, Dakota and Kansas. Described by Dietz as a new species under

the above name, he stating that Schwarz's description under the same name was not accessible to him.

724 (8856). PHYTOBIUS VELATUS Beck, Beitr. zur Bæirsch Ins. Faun., 1817, 20.

Elongate-oval. Black, clothed above with greenish-yellow scales, more dense on median line and sides of thorax and suture and sides of elytra; beneath with larger grayish-yellow scales; antennæ and legs reddish-brown, knees dusky. Beak short, stout, slightly longer than head, punctured and scaly towards base. Thorax slightly wider at base than long, lateral tubercles small, rounded; disc rather coarsely and densely punctured, its dorsal channel wide, entire. Elytra one-third wider at base than thorax, sides gradually narrowed from the shoulders; striæ deep, wide, punctate; intervals convex, rugose. Tarsi with swimming hairs. Length 2.2—2.5 mm.

A common European species taken in this country in Massachusetts, near Detroit, Mich., in Dane Co., Wisconsin, and on Vancouver Island. Its habits are aquatic, the adults ovipositing on pondweed (*Potamogeton*). It is also found in all stages under water on the filiform leaves of the spiked water-milfoil, *Myriophyllum spicatum* L., a common European and American deep fresh-water plant. "The larvæ are covered with a viscous liquid insoluble in water; when about to pupate the body is covered with a large quantity of gum exuded from the anus. This hardens into a spherical cocoon which is firmly attached to a branch of the plant, the larvæ remaining constantly under water, the adults only coming to shore to hibernate under debris in very wet places." (*Perris.*) Schwarz records finding in the fall, near Detroit, Mich., a number of specimens hibernating in moist ground on the banks of the Riviere Rouge, which at that locality is filled with *Myriophyllum*. The beetle probably occurs in this country wherever this milfoil grows and should be sought for by collectors as American examples are very scarce. Redescribed by Dietz under the name *P. lecontei*.

Tribe XXI. CRYPTORHYNCHINI.

A large assemblage of rather broad, robust, often strongly sculptured species varying greatly in appearance and structural detail. In addition to the characters given in the tribal key, p. 140, we find the funicle 7- rarely 6-jointed, club annulated; tibiæ armed with a strong hook at tip, their articular surface oblique; tarsi dilated with the third joint bilobed; second and third ventral segments somewhat angulated at the sides and variable in length; upper surface often clothed with scales or setæ or both, arranged in conspicuous designs.

Our representatives of this tribe, while fairly numerous, are insignificant compared with those occurring to the south of our territory, and from their diverse character are difficult to arrange lineally. Our arrangement, which does not profess to show relationships, aims to draw together for the convenience of the student of our fauna alone, first, the forms with prominent humeri, second, those that are glabrous or nearly so, third, a number of heterogeneous forms with characters alien to the bulk of the tribe, finally the true *Cryptorhynchus*- and *Acalles*-like forms which are regarded as the typical members of the tribe. We follow LeConte in recognizing but two subtribes as the division of the second by various recent authors is quite unsatisfactory, their Tylodini being a heterogeneous assemblage united only by characters pertaining to the metasternum that are difficult to observe. If any division is made it must extend beyond two, and would finally result in exalting many of the genera to subtribal rank. The tribe has not been recently monographed by any American author, and the literature pertaining to our species is widely scattered.

KEY TO SUBTRIBES OF CRYPTORHYNCHINI.

a. Pectoral groove confined to the prosternum (except in *Phyrdenus*), open behind; elytra suddenly wider than thorax, their humeri prominent; femora usually toothed beneath. Subtribe I. Ithypori, p. 465.

aa. Pectoral groove extending behind the front coxæ into the mesosternum, sharply limited behind; elytra oval, never with prominent humeri (*Gerstaeckeria* is prominent behind the humeri.)
Subtribe II. Cryptorhynchi, p. 488.

Subtribe I. Ithypori.

The members of this subtribe have the eyes coarsely granulated; thorax usually smaller than in the other group and very coarsely sculptured; femora toothed beneath except in *Phyrdenus* and *Microhyus*. *Micralcinus*, usually placed in this subtribe, has been removed to subtribe II, near *Tylodema*, which it resembles in facies, if not indeed identical therewith. *Phyrdenus*, notwithstanding the deep excavation of the mesosternum and simple femora, has been added to this subtribe on account of its prominent humeri and resemblance to *Conotrachelus*. Its feebly spined tibial apex makes it exceptional wherever placed, and we prefer to assist the student as far as possible by associating forms of similar facies. Following Casey, the genus *Zaglyptus* Lec. is transferred to the tribe Barini.

KEY TO GENERA OF SUBTRIBE ITHYPORI.

a. Upper surface with scales.

b. Head sulcate, with prominent tubercle each side; tibiæ feebly spined at tip. I. PHYRDENUS.

bb. Head not sulcate, without tubercles; front coxæ contiguous; claws toothed or cleft; tibiæ with the usual strong hook. II. CONOTRACHELUS.

aa. Upper surface without ornamental scales.

c. Upper surface glabrous, without scales or setæ.

d. Middle coxæ narrowly separated; second ventral not as long as next two combined.

e. Tarsal claws equally toothed or cleft, not connate; two outer striæ of elytra separated by a short costa. III. RHYSSEMATUS.

ee. Tarsal claws simple, stout, connate at base; outer striæ of elytra represented only by a few coarse punctures at base, the interval adjoining flat. IV. CHALCODERMUS.

dd. Middle coxæ widely separated, the mesosternum depressed between them; second ventral longer than the next two combined; tarsal claws small, slender, not connate; elytra striate-punctate, intervals equal, strongly convex. V. CHALEPONOTUS.

cc. Upper surface with long, stout, erect setæ; claws divergent, slender, simple; form small, globose. VI. MICROHYUS.

I. PHYRDENUS Lec., 1876.

Beak as long as thorax, slightly compressed near middle, somewhat widened and flattened toward apex, its antennal grooves oblique; antennæ inserted one-fourth from tip; club oval, annulated; eyes large, coarsely granulated, widely separated, almost wholly concealed in repose by the very large postocular lobes; pectoral groove deep, ending in the mesosternum which is very deeply excavated; side pieces of metathorax rather large, distinct; second and fifth ventral segments each slightly longer than the third or fourth; femora not toothed, tibiæ bent at base, feebly spined at tip. Two species are known, one of which has a wide range in our territory, the other apparently being confined to the south.

725 (8785). PHYRDENUS DIVERGENS Germ., 1824, 282.

Broadly oval, robust. Blackish, densely clothed with very small scales intermixed with bristles, the scales forming a dense crust of a pale brown color, varied with darker on thorax, base and declivity of elytra. Thorax as wide as long, sides parallel from base to middle, then strongly converging to apex; disc uneven, deeply and broadly channeled, with four conspicuous tufts of black bristles. Elytra at base nearly twice as wide as thorax, humeri prominent; striæ fine, hidden by scales; alternate intervals distinctly elevated, all with rows of rather stout erect bristles. Length 4.5—4.8 mm.

Lake and Vigo counties, Ind., scarce; July 5—28. Great Falls, Md., June 27. Ranges from New Jersey, where it occurs in swamps, to Missouri, south to Florida and Texas. Occurs on black night-shade, *Solanum nigrum* L. (*Ulke.*) *P. undatus* Lec. is a synonym.

726 (11,072). PHYRDENUS MURICEUS Germ., 1824, 281.

Larger and relatively broader than *divergens* and similarly colored. Head and beak roughly and densely scaly, the former strongly, transversely impressed; beak not quite as long as thorax, feebly bent, roughly and densely sculptured. Thorax very nearly as long as wide, angulate at sides before the middle, the disc very uneven, the median impression broad and feeble; punctures very dense but even and rather fine. Elytra about twice as wide as thorax, not longer than wide; intervals alternately strongly ridged and flat; punctures coarse and rather uneven. Second abdominal segment but slightly longer than third (nearly as long as the next two in *divergens*), the basal segment not more coarsely punctate, but having in addition to the finer punctures others much larger and more widely scattered. Length 5.4 mm.

In Slosson collection from Key West, Fla. (*Schwarz.*) *P. bullatus* Casey (1892, 458), described from Arizona is, according to Champion, a synonym.

II. CONOTRACHELUS Schön., 1837. (Gr., "conical" + "thorax.")

The characters of this genus have been fully set forth under the subtribal heading and in the key to genera. The antennal grooves are not confluent behind and the hind femora are not club-shaped. The genus is confined to the western Continent, more than 40 species being known from the United States, 28 of which occur east of the Mississippi River. Many of them are very injurious to cultivated fruits, especially the plum, peach, apricot and quince; others attack the stems of plants; all pupate in the ground. For convenience of treatment they are separated into six groups.

KEY TO GROUPS OF CONOTRACHELUS.

a. Claws divergent, toothed, not cleft.
  b. Thorax not sulcate, usually carinate.
    c. Femora with two teeth; costæ of elytra usually interrupted. GROUP I.
    cc. Femora with but one tooth; costæ either entire or absent.
      d. Beak slender, much longer than head and thorax. GROUP II.
      dd. Beak rather stout, curved, scarcely longer than head and thorax. GROUP III.
  bb. Thorax broadly and shallowly sulcate, with two low crests in front. GROUP IV.

aa. Claws approximate, cleft.
e. Pubescence prostrate, fine. GROUP V.
ee. Pubescence mixed with stout, erect bristles. GROUP VI.

GROUP I. (NENUPHAR GROUP.)

The species of this group have the costæ of the third and fifth intervals of elytra usually more or less interrupted in two places; thorax strongly constricted near tip; pubescence short, fine and appressed, usually forming one or more slender pale oblique lines each side of thorax and a broad band behind the middle of elytra.

KEY TO SPECIES OF GROUP I.

a. Costæ of elytra abruptly and strongly interrupted.
b. Elytral band uniformly pale yellow or white.
c. Third interval with a high, oblong crest or tubercle at middle; elytral band pale yellow. 727. JUGLANDIS.
cc. Third interval without elevated crest near middle; elytral band white. 728. ALBICINCTUS.
bb. Elytral band white and yellow; third interval with a high black crest near middle as in *juglandis*. 729. NENUPHAR.
aa. Costæ of elytra feebly or not at all interrupted.
d. Thorax with a small median callus or tubercle. 730. RETENTUS.
dd. Thorax more or less distinctly carinate.
e. Elytral costæ not at all interrupted; thorax without oblique pubescent lines. 731. FALLI.
ee. Elytral costæ feebly interrupted; thorax with narrow oblique lines of pale pubescence.
f. Second, third and fourth ventral segments finely and sparsely punctured. 732. AFFINIS.
ff. Ventral segments coarsely and closely punctured.
g. Thorax distinctly carinate from tip nearly to base; hind femora with a large acute tooth and a small denticle; oblique, pubescent lines of thorax meeting in front. 733. SENICULUS.
gg. Thoracic carina feeble; hind femora with two small denticles; oblique thoracic lines not meeting in front.
h. All the ventral segments closely and rather coarsely punctate, last ventral without tubercles; elytral band well defined. 734. ELEGANS.
hh. First and second ventrals very coarsely, not densely punctate; fifth finely, more densely punctate and with two distinct tubercles; elytral band ill defined. 735. ARATUS.

727 (8712). CONOTRACHELUS JUGLANDIS Lec., 1876, 226.

Elongate-ovate. Dark brown, varied with black; pubescence grayish-yellow, forming a curved, bifurcate line each side of thorax, a broad band behind the middle of elytra and two rings on each femur. Beak cylindrical, longer than head and thorax, shining, sparsely punctured, pubescent and with a broad lateral groove and two short finer ones on basal

Fig. [illegible]. Beetle. ×6; side view of head and beak. (After Felt.)

half. Thorax broadly constricted in front, sides rounded on basal two-thirds, disc coarsely, rugosely punctured, with a short carina before the middle and four small tubercles. Elytra with rows of large quadrate punctures; alternate intervals strongly costate, third and fifth interrupted, each with a high median costa. Ventral segments sparsely punctured. Length 5—7 mm. (Fig. 104.)

Lake, Hamilton and Posey counties, Ind., scarce; May 12—July 4. Not rare near New York City, May —July. Ranges from Quebec and New England to Illinois, south to Georgia. Known as the "walnut curculio," occurring on walnut, butternut and hickory, the larvæ breeding in the green fruit.

728 (8713). CONOTRACHELUS ALBICINCTUS Lec., 1876, 226.

Closely allied to *juglandis*. Thorax with a compressed line each side of yellow and gray hairs; elytra with posterior band broad, narrower toward the sides, composed of pure white or grayish-yellow hair, and a conspicuous white spot at base of third interval. Beak more stout, longer than thorax, curved, deeply striate, carinate and punctate. Crest of fifth interval of elytra less elevated and scarcely separated from the subbasal part of the costa. Ventral segments coarsely and rather densely punctured. Length 3.5—4.7 mm.

Marion, Dubois and Perry counties, Ind., scarce; May 12—June 14. Ranges from Michigan and District of Columbia to Georgia, Florida and Texas, where it occurs on *Clematis* and *Celtis*, and was bred from a gall on *Cornus candidissima* Marsh. (*Pierce.*)

729 (8714). CONOTRACHELUS NENUPHAR Hbst., 1797, 29.

Dark brown varied with black; pubescence brownish-yellow, forming a curved bifurcate line each side of thorax and a post-median elytral band composed of yellow and white hairs; a conspicuous white line at base of third interval. Beak stout, curved, slightly longer than head and thorax, strongly striate and punctured. Thorax as wide as long, sides feebly rounded, disc strongly constricted near apex, carinate in front of middle, coarsely and roughly punctate. Crests of elytra more abrupt, the median ones more prominent than in *juglandis* and *albicinctus*. Ventral segments coarsely and densely punctured, the fifth with two setæ-bearing tubercles. Length 4.5—6.5 mm. (Fig. 105.)

Common throughout Indiana; April 21—July 15; beaten from wild plum and *Crataegus*. Common throughout New Jersey, May

to July and again in August. Abundant over the United States east of the 100th meridian, its range extending from Newfoundland and Quebec, Canada, to Florida and Texas. Known as the "plum curculio," breeding in plum, peach, cherry and apple, often in destructive numbers, causing an estimated annual loss of

Fig. 105. *a*, Larva; *b*, beetle; *c*, pupa. All much enlarged. (After Riley.)

$8,500,000 in the United States. Quaintance and Jenne (1912) state that "The adults hibernate, and issue from their winter quarters about the time the trees are in bloom, feeding on the tender foliage, buds and blossoms. Later they attack the newly set fruit, cutting small circular holes through the skin in feeding, while the females, in the operation of egg-laying, make the small, crescent-shaped punctures so commonly found on plums and other stone fruits. The egg, deposited under the skin of the fruit, soon hatches into a very small whitish grub, which makes its way into the flesh of the fruit. Here it feeds greedily and grows rapidly, becoming, in the course of a fortnight, the fat, dirty white 'worm' so well known to fruit growers. When the larva obtains full growth, which requires some twelve to eighteen days, it bores its way out of the fruit and enters the soil, where it forms an earthen cell in which to pupate. The time required for the pupal stage and the emergence of the normally colored beetle is from three to four weeks. Thus the period of development from egg to adult is covered in from five to seven weeks." It may be controlled by persistent spraying with arsenate of lead, one pound in 20 gallons of water. Jarring the trees in spring and early summer over white cloth stretched over a frame, and destroying the beetles thus collected is also a common remedy.

730 (8715). CONOTRACHELUS RETENTUS Say, 1831, 27; ibid. I, 295.

Oblong-oval. Dark reddish-brown, nearly uniformly clothed with short, dark gray pubescence; antennæ and legs pale reddish-brown; thorax with

a vague curved line of pubescence each side. Beak long, slightly curved, strongly striate and punctured. Thorax at base scarcely wider than long, sides much rounded and strongly constricted in front; disc densely rugosely punctured, with a small median callus and some indistinct tubercles. Elytra oblong-oval, the striæ, with distant quadrate punctures; alternate intervals moderately carinate, the third and fifth each interrupted twice, the seventh broadly interrupted behind the humerus. Ventral segments sparsely punctured, fifth more densely and finely punctured. Length 7 mm.

Recorded from Allegheny, Pa., Topeka, Kansas, Mendenhall, Miss., and Haulover, Fla. Beaten from red oak sprouts by Dr. Hamilton. A large and rather smooth reddish species.

731 (——). CONOTRACHELUS FALLI sp. nov.

Broadly oval. Dark reddish-brown or piceous, antennæ, tibiæ and tarsi paler; surface sparsely clothed with fulvous and pale gray scales, the latter forming a small spot at bases of third and fifth elytral intervals, a few small remote spots on elytra and a ring near apex of each femur; the fulvous ones thinly clothing the head, beak, legs and sterna, and condensed in a broad cross-bar at apical third of elytra. Beak as long as thorax, feebly curved, finely striate and punctate. Thorax slightly wider than long, sides almost straight and parallel from base to beyond middle, then abruptly converging and feebly constricted to apex; disc densely and very coarsely cribrately punctate and distinctly carinate on median third. Elytra oval, humeri prominent, rounded, sides broadly feebly curved from base to apex; striæ with rows of large, deep, rounded punctures; third, fifth and seventh intervals narrow, entire, strongly elevated. Abdomen rather coarsely, closely and evenly punctate, each puncture enclosing a very short prostrate yellow hair. Femora each with two small but distinct teeth; tarsal claws widely separated, strongly toothed. Length 5.5 mm. (*W. S. B.*)

Porter County, Ind., rare; June 5. The coarsely sculptured and almost naked thorax, and entire acute alternate elytral costæ readily separate this from all other members of the group. Named in honor of H. C. Fall, a leading authority on American Coleoptera, who has aided us in many ways during the preparation of this work.

732 (8717). CONOTRACHELUS AFFINIS Boh., Schön., 1837, 429.

Oval. Dark brown or piceous; pubescence of thorax brownish-yellow, forming broad, curved, sinuate and irregularly branching lines on the disc and sides; elytra thinly pubescent, with a short basal line on third interval and a broad posterior band brownish-yellow. Beak long, slender, moderately curved, strongly striate and punctured. Thorax at base scarcely wider than long, deeply constricted in front, sides broadly rounded, disc rather densely rugose-punctate, carinate on apical half and with a transverse impression about the middle. Elytral striæ composed of large, distant, quadrate punctures; intervals alternately carinate, first carina broadly interrupted in two places, second feebly interrupted near base. Length 5—7 mm.

Fairfax Co., Va., June. South Orange and Ft. Lee, N. J., May—June. Recorded also from Ohio, District of Columbia, Louisiana and Florida. Larvæ were found in fallen hickory nuts in Louisiana in June. (*Pierce.*) Liable to be confused with *juglandis*, being of the same size and quite similarly marked; however, the median costa is not so high, color darker and elytral fascia not white.

733 (8716). CONOTRACHELUS SENICULUS Lec., 1876, 227.

Oval. Dark brown, antennæ, tibiæ and tarsi paler; thorax with a straight, oblique line of yellowish pubescence each side, the two united at tip; elytra thinly clothed with grayish pubescence which is condensed in a faint transverse band behind the middle. Beak as long as thorax, stout, curved, strongly punctured and striate. Thorax at base slightly wider than long, constricted in front, rounded on sides, strongly rugosely punctured. Elytra with alternate intervals carinate, the third interrupted in two places, the fifth at the pubescent band; strial punctures large, distant, quadrate, each with a very short gray seta. First ventral segment more sparsely punctured than the others. Length 3.7—4.8 mm.

Common throughout southern Indiana; Starke County only in the north; April 19—Oct. 12. At various localities in southern New Jersey; May 31—August. Lake Okeechobee, Fla., March 6. Ranges from Quebec and New England to Michigan and Kansas, south to Mississippi and Florida. Beaten from plum and peach. (*Pierce.*)

734 (8718). CONOTRACHELUS ELEGANS Say, 1831, 18; ibid, I, 283.

Form and size of *seniculus*, more thinly pubescent; the thoracic lines narrow, curved, not meeting in front; elytra with large blackish discal space, their pubescence more yellow, less mixed with gray. Beak distinctly longer than head and thorax, less curved, strongly striate, punctate. Thorax narrower, longer than wide, densely and coarsely punctate, very feebly carinate, faintly tuberculate. First elytral carina twice interrupted, the second not interrupted behind. Femoral teeth small, acute, nearly equal. Length 3.8—4.5 mm.

Throughout Indiana, but scarce; beaten from hickory; May 6—Aug. 11. Brown County, locally common on apple trees; April 29. Throughout New Jersey, May—September. West Point, N. Y. Ranges from Massachusetts to Michigan and Missouri, south to Florida. The larva feeds on underground stems of the rough pigweed, *Amaranthus retroflexus* L. (*Chittenden.*) Oviposits in partly rolled up leaves of pig-nut hickory, cutting off the leaves during the process. (*Packard.*) Common on hickory, on the leaves of which the larvæ live.* (*Hamilton.*)

*The contradictory biological notes in this genus may be due to varying interpretations of the older descriptions.

735 (8719). Conotrachelus aratus Germ., 1824, 283.

Oblong-ovate. Piceous, elytra variegated with reddish-brown; thinly clothed with fine, short yellowish pubescence, the lines of thorax as in *elegans;* elytral band and a spot at base of second interval whitish; antennæ and tarsi pale. Beak stout, as long as head and thorax, finely striate, carinate, rather densely punctate. Thorax as wide as long, sides rounded from base to beyond middle, constricted near apex; disc densely and rather coarsely punctate, not or very feebly carinate. First carina of elytra twice interrupted, that of fifth interval not interrupted near base. Length 4 mm.

Atlantic County, N. J., rare; Sanford and Dunedin, Fla., rare; March 28—April 4. Described from Kentucky. Recorded also from Massachusetts and Texas. Easily known from allied species by the punctuation of ventral segments as given in key and by the fifth ventral bearing two tubercles as in *nenuphar*.

Group II. (cratægi group.)

In this group the beak is slender, longer than head and thorax; alternate intervals of elytra elevated but (except in *belfragei*) not interrupted; thorax more or less carinate, not grooved; surface finely pubescent with, at most, lines of very short bristles on elytra; femora armed with a single usually acute tooth.

KEY TO EASTERN SPECIES OF GROUP II.

a. Elytra strongly widened at base, their humeri with a small obtuse tooth on outer side; ventral segments 2—4 sparsely punctured. 736. cratægi.

aa. Elytra normally widened at base, their humeri not dentiform.

b. Ventral segments very shining, with a few scattered large punctures, more numerous on the fifth; antennæ inserted at apical third of beak. 737. serpentinus.

bb. Ventral segments densely and coarsely punctate; antennæ inserted at middle of beak.

c. Elytra each with an elevated crest or tubercle at middle near suture, with a large common white spot just behind. 738. belfragei.

cc. Elytra without tubercle and spot as above; thorax strongly constricted in front; smaller, not over 6.5 mm.

d. Femoral tooth large, acute; white markings conspicuous without intermixed bristles. 739. similis.

dd. Femoral tooth obtuse; pubescence intermixed with bristles. 740. naso.

736 (8721). CONOTRACHELUS CRATÆGI Walsh, Proc. Bost. Soc. Nat. Hist., IX, 1863, 311.

Broadly ovate. Brownish-piceous, densely and finely clothed with clay-yellow and ash-gray scales, the latter forming a double line of paler pubescence each side of thorax, the lines meeting in front of the middle and in fresh specimens, passing backward onto humeri and across the basal third of elytra; body beneath thinly clothed with yellowish pubescence. Beak punctured, deeply striate, carinate above. Thorax broadly, transversely impressed in front, elevated at middle, strongly carinate, coarsely punctured. Elytra with third, fifth, seventh and ninth intervals strongly carinate, with broad furrows between the carinæ, each with two rows of coarse, quadrate punctures; humeri obliquely truncate, with outer angles dentiform. Body beneath sparsely and very coarsely punctured, third and fourth ventral segments more sparsely, fifth more densely punctured. Thighs armed with a large, not very acute tooth. Length 4—6 mm. (Fig. 106.)

Fig. 106. *a*, Side view; *b*, dorsal view. × 3. (After Riley.)

Frequent throughout Indiana; much more so in the southern counties; May 11—August 11. Beaten from *Cratægus*. Locally throughout New Jersey on quince, sometimes injurious; June—August. Batavia, N. Y., July 10—25. Ranges from New England to Michigan and Iowa, south to Georgia. Known as the "quince curculio," the adult eating a little hole in the fruit in which the egg is deposited; the larvæ living in the fruit till fall, when they leave it and burrow into the ground, pupating in early spring. (*Banks.*) Lives also in the fruit of *Cratægus*.

737 (8722). CONOTRACHELUS SERPENTINUS Boh., Schn., 1837, 402.

Elongate-oval, rather robust. Blackish-brown, thinly clothed, but scarcely mottled, with coarse, pale brownish hairs. Beak rather stout, one-third longer than head and thorax, brown, shining, scarcely punctured, striate each side; head strongly punctured. Thorax as long as wide, widest at base, feebly constricted at apex; disc very deeply, coarsely and densely punctured, its elevated dorsal line narrow. Elytra at base one-half wider than thorax, humeri rounded; striæ composed of coarse punctures; intervals not costate at base, but third and fifth becoming gradually acute behind the middle, seventh acute for whole length, united in front at a sharp angle with ninth, which is also acute throughout, the two united forming the humeral margin. Length 6—7 mm.

Biscayne Bay and Enterprise, Fla. Schwarz (1890, 233) states that it is found exclusively on the red bay, *Persea borbonia* L., the larvæ probably living in the galls of a psyllid, *Trioza magnoliæ* Ashm. *C. ventralis* Lec. (1878, 428) is a synonym.

738 (8724). CONOTRACHELUS BELFRAGEI Lec., 1876, 419.

Oval, rather robust. Black or piceous, clothed with short brownish-red hairs and oval white scales, the latter forming a large, irregular white

spot each side of thorax, a large saddle-shaped one behind the middle of elytra, some small spots near the scutellum, a ring around the hind femora and three rows of small spots on the abdomen. Beak half as long as body, opaque, feebly curved, rather sparsely punctured. Thorax wider than long, sides parallel from base to beyond middle, then rounded and obliquely narrowed to tip; disc strongly convex at middle, densely and rather coarsely punctured. Elytra at base one-half wider than thorax; striæ composed of very coarse and deep punctures; third interval with three elevated crests, the median one much the larger, with a broad bare, coarsely punctured impression between it and the base; the other alternate intervals finely carinate. Under surface densely punctured. Length 4 mm.

Eustis, Fla., April 6; one specimen beaten from pine. Described from a single specimen taken in Texas by Belfrage. Recorded also from Rock's Resaca, Texas, by Townsend. The most strikingly colored species of this large genus, the large white spots on thorax each with two narrow prongs, one oblique, reaching the apex, the other nearly attaining the median line.

Conotrachelus adspersus Lec., (1876, 230) was recorded by Dury, probably erroneously, from Cincinnati, Ohio, it being known otherwise only from Kansas. It may be readily recognized by its large size (7—7.5 mm.), non-constricted thorax and nearly uniform grayish-yellow pubescence.

739 (8725). Conotrachelus similis Boh., Schn., 1837, 416.

A large robust species clothed with short, pale reddish-brown pubescence, handsomely variegated with white, which forms a complex pattern each side of thorax, a wide, irregular postmedian band on elytra and three rows of spots on abdomen. Beak of male one-third longer than head and thorax, striate, feebly punctured; of female, red, two-thirds as long as body, very slender, smooth, polished. Thorax short, one-third wider than long, sides nearly parallel from base to beyond middle, then strongly converging to apex; disc rather finely, very densely punctured, finely carinate from tip to middle. Punctures of elytral striæ very large, quadrate; alternate intervals distinctly but not strongly carinate. Body beneath coarsely, rather densely punctured. Length 5—6.5 mm.

Tybee Island, Ga., June 6; Crescent City, Fla. Schwarz (1890, 232) states that the imago appears in numbers on the woolly buckthorn, *Bumelia lanuginosa* Michx., when the tree is in bloom. Breeds in the berries. (*Pierce.*) The large white spots on thorax and elytra are shaped almost like those of *C. belfragei*.

740 (8726). Conotrachelus naso Lec., 1876, 231.

Elongate-oval. Dark reddish-brown, very thinly clothed with dirty brown pubescence, thorax with a small spot of white pubescence each side of middle; elytra with a narrow band of yellowish hairs on apical third. Beak of male one-third longer than head and thorax, striate from base to antennal insertion, finely punctate; of female, slender, curved, shining,

more than half the length of body, finely striate on basal half. Thorax one-third wider than long, sides rounded, suddenly strongly constricted near apex, disc densely rugosely punctured, the median carina distinct, nearly entire. Base of elytra one-third wider than thorax, strongly sinuate, humeri rounded; striæ composed of small, closely placed quadrate punctures; alternate intervals finely carinate, their surface more densely pubescent and with rows of very short bristles. Beneath densely, coarsely punctured; last ventral with a round impression near tip. Length 5.5—7 mm.

Putnam County, Ind., rare; May 3. Long Beach, N. Y., June 11. Atlantic County and Anglesea, N. J.; May—August. Ranges from New York to Indiana, south to Florida and Texas. Bred from the fruit of hawthorn, *Cratægus*. (*Hamilton.*) Pierce (1907, 275) states that it breeds in acorns of post- and live-oaks. 266 larvæ having been taken from 167 acorns of live-oak, *Quercus virginiana* L. in Texas in October. The larvæ entered the ground immediately, began to pupate March 15, the first adult appearing April 2.

GROUP III. (POSTICATUS GROUP.)

This group differs from II mainly in the length of the beak, which is seldom longer than head and thorax, striate, at least on basal half, with the antennæ (except in *floridanus*) inserted not more than one-third behind its tip.

KEY TO EASTERN SPECIES OF GROUP III.

a. Mesosternum perpendicular in front, and produced in a small rounded process between the middle coxæ.

b. Thorax with a more or less distinct median carina.

c. Antennæ inserted at apical fourth or third; third and fourth ventral segments coarsely and densely punctured. 741. POSTICATUS.

cc. Antennæ inserted just in front of middle, male, slightly behind middle, female; third and fourth ventrals very sparsely and finely punctured. 742. FLORIDANUS.

bb. Thorax without trace of median carina.

d. Larger, 4 or more mm. 743. COGNATUS.

dd. Smaller, not over 2.7 mm. 744. PUSILLUS.

aa. Mesosternum slanting downward in front, flat above, not produced forward.

e. Thorax without longitudinal ridges, its punctures distinct, cribrate. 745. GEMINATUS.

ee. Thorax with longitudinal ridges, at least near the middle.

f. Pubescence short, without intermixed bristles on the elytra. 746. INFECTOR.

ff. Pubescence with rows of short, erect bristles intermixed. 747. CRIBRICOLLIS.

741 (8727). Conotrachelus posticatus Boh., Schn., 1837, 406.

Oval. Piceous or dark reddish-brown, very thinly clothed with short prostrate reddish-yellow hairs, condensed on elytra to form numerous small blotches and an indistinct yellowish band near apical fourth; third interval with a small grayish spot at base. Beak as long as head and thorax, feebly curved, strongly striate. Thorax about as wide as long, sides feebly rounded, disc broadly constricted near apex, densely and coarsely punctate, with a nearly entire, narrow median carina. Elytra at base nearly one-half wider than thorax, humeri rounded, sides somewhat rounded and distinctly converging from base to apex; strial punctures large, round, close-set; alternate intervals finely but distinctly carinate. Femora all strongly, not acutely, toothed beneath. Length 4.5—5.5 mm.

Lake and Posey counties, Ind., frequent locally; April 26—Sept. 3; beaten from blossoms of wild plum. Throughout New Jersey, May—September; not rare. McGregor, Iowa, July 14. Lake Okeechobee and Dunedin, Fla., March 2—29. Ranges from Ontario and New England to Wisconsin and Iowa, south to Florida. Raised from fruit of *Crataegus* by Hamilton; has been observed to live within Phylloxera galls on hickory leaves by Schwarz (1890, 233), and said to breed in hickory nuts by Pierce. Resembles *naso* in color, but very distinct in the short striate beak with antennæ inserted near its tip. In many specimens the second elytral interval is as strongly carinate as the third.

742 (——). Conotrachelus floridanus Fall, 1913, 66.

Oblong-oval. Piceous; tibiæ and tarsi rufo-piceous, closely, somewhat unevenly clothed with narrow scales and scale-like hairs, clay-yellow and white in color, the latter condensed in a short band near declivity and a few very small spots on thorax and costæ of elytra. Beak one-third longer than thorax, male, one-half longer, female, shining and sparsely punctate near tip, more coarsely punctate and striate near base. Thorax scarcely wider than long, sides feebly curved from base to beyond middle, then suddenly narrowed and constricted; disc rather coarsely and densely punctate, the median carina obsolete on basal third. Elytra one-half wider and two and a half times longer than thorax, sides parallel from base to middle, then gradually rounded to apex; alternate intervals distinctly not strongly costate. Length 4.4—5 mm.

Miami, Florida. "Differs from *posticatus* by its more conspicuous and coarser vestiture, more oblong form, less developed thoracic and elytral costæ and much sparser and finer ventral punctuation." (*Fall.*)

743 (8728). Conotrachelus cognatus Lec., 1878, 429.

Oblong-oval. Blackish, elytra mottled with dull fulvous; pubescence short, irregularly condensed, a small spot of white scales at the base of the third elytral interval. Beak as in *posticatus*, the antennæ inserted less

than one-fourth from tip. Thorax wider than long, sides strongly rounded in front, nearly straight near base; disc coarsely and densely punctured. Elytra oblong, rounded behind, at base one-half wider than thorax; strial punctures large, quadrate; alternate intervals acutely, not strongly costate. Length 4.3 mm.

Tampa and New Smyrna, Fla. (*Schwarz.*) "Differs from *posticatus* chiefly by the thorax being not carinated and by the less robust form." (*LeConte.*)

744 (8729). CONOTRACHELUS PUSILLUS Lec., 1878, 429.

Small, oval. Dark reddish- or blackish-brown, with irregularly condensed pubescence; elytra mottled with dull fulvous. Beak stout, curved, longer than head and thorax, deeply striate. Thorax as wide as long, sides feebly rounded, broadly constricted near apex; disc densely and coarsely punctured, not carinate. Elytra oblong-oval, humeri rounded, striæ composed of large punctures; third, fifth and seventh intervals moderately carinate, ninth carinate behind the middle. Beneath coarsely punctured, fifth ventral broadly impressed. Length 2.5—2.7 mm.

Orange County, Ind., rare; June 1. Taken by sweeping. Near Providence, R. I. (*Fall.*) Enterprise and Lake Worth, Florida. This and *hispidus* are our smallest species of the genus.

745 (8730). CONOTRACHELUS GEMINATUS Dej., 1837, 322.

Oval, robust. Dark reddish-brown, thinly clothed with very fine yellowish pubescence; thorax with a small yellowish spot each side of middle; elytra mottled with grayish bands and with a whitish spot at base of third interval and rows of very short bristles; antennæ, tibiæ and tarsi pale reddish-brown. Beak stout, shorter than thorax, striate, densely punctate, male; one-fourth longer and shining toward tip, female. Thorax not wider than long, sides almost parallel, disc coarsely, evenly and densely punctate. Elytral striæ composed of large, quadrate punctures; intervals broad, flat, the third and fifth slightly elevated near the declivity. Body beneath coarsely punctured; thighs armed with a large obtuse tooth. Last ventral of female with a large, well defined apical impression. Length 4—4.5 mm.

Lake, Kosciusko, Vermillion and Vigo counties, Ind., frequent; June 10—August 11. Common in New Jersey, August to the following July. Ranges from Quebec and New England to Iowa and Kansas, south to Florida. Taken by beating the great rag-weed, *Ambrosia trifida* L. (*Hamilton.*) When the pubescence is removed the elytra are seen to be reddish-brown mottled with numerous small blackish spots.

746 (8731). CONOTRACHELUS INFECTOR Boh., Schn., 1845, 49.

Similar to *geminatus*, but the pubescence more yellowish, not mixed with gray. Thorax distinctly carinate, more coarsely sculptured, the cribrate punctures being confluent so as to leave longitudinal ridges; the quad-

rate punctures of elytral striæ more close-set; intervals narrower and more convex. Last ventral of female not impressed. Length 4.2—5.2 mm.

Starke County, Ind., rare; June 8. Described from Pennsylvania. Recorded from New York and Ft. Capron and Tampa, Fla.

747 (8732). Conotrachelus cribricollis Say, 1831, 28; ibid, I, 296.

Oval. Color of *geminatus;* pubescence of elytra much more dense and coarse. Beak shorter, stouter, more deeply rugose-striate. Thoracic punctures very coarse and deep, so that the surface appears reticulate. Elytra oval, more than one-half wider at base than thorax, sides feebly converging to the rounded apex; strial punctures rather small, round, deep, close-set; intervals feebly convex, each with a row of stout, suberect bristles. Length 3.2—4.5 mm.

Frequent in southern Indiana; Marshall County only in the north; April 9—June 25. Taken in early spring beneath bark of dead oak, and by sifting. Westville, N. J., Jan. 28, by sifting. Bowmanville, Ill., Oct. 20. Black Mountains, N. C., June. Ranges from New England to Northern Illinois, south to Louisiana and Texas.

Group IV. (anaglypticus Group.)

Species of broad, rather flat form, having the beak curved, as long as or slightly longer than head and thorax, strongly striate and punctured; thorax coarsely sculptured, with two more or less distinct crests in front of middle, between which is a wide shallow groove; elytra at base nearly twice as wide as thorax, their alternate intervals strongly carinate, sometimes abruptly interrupted; under surface very coarsely punctate; femora each armed with a large tooth and (except in *coronatus*) a small denticle.

KEY TO SPECIES OF GROUP IV.

a. Alternate elytral intervals strongly interrupted.
  b. Thorax with a single pale line each side; crests of elytra with black reclined bristles. 748. CORONATUS.
  bb. Thorax with two narrow, pale lines each side, crossed by a curved one in front of middle; crests of elytra without bristles. 749. TUBEROSUS.
aa. First or second elytral intervals only feebly interrupted.
  c. Elytra distinctly costate and with a short oblique yellowish humeral stripe. 750. ANAGLYPTICUS.
  cc. Elytra feebly costate, without yellowish humeral stripe, their surface in great part white. 751. LEUCOPHÆATUS.

748 (8733). CONOTRACHELUS CORONATUS Lec., 1878, 430.

Blackish, thinly clothed with very fine brownish-gray pubescence and scattered pale clavate bristles, with markings of dense, fine white scales forming a narrow white stripe each side of thorax, which extends from apex to base and connects with a short white line at base of third elytral interval; forming also a large marginal spot on elytra behind the humerus and a band composed of spots behind the middle. Beak very stout, bent beyond the middle, not longer than head and thorax, deeply and broadly striate, carinate above. Thorax as long as wide, sides straight, disc rough and bearing a lateral, four apical and two median tubercles. Elytra with the alternate intervals interrupted, forming black tubercles bearing reclined clavate bristles. Beneath very coarsely punctured. Femora with a single acute and prominent tooth. Length 3 mm.

Described from Enterprise, Fla.

749 (8734). CONOTRACHELUS TUBEROSUS Lec., 1876, 233.

Short, ovate. Dark reddish-brown, thinly clothed with very fine, short yellowish pubescence; thorax with pale lines as mentioned in key; elytra with a narrow transverse yellowish band on apical third; antennæ, tibiæ and tarsi pale reddish-brown. Beak curved, rather stout, as long as head and thorax, strongly striate. Thorax longer than wide, sides feebly rounded, disc densely, rugosely punctured, opaque, with two very narrow crests or raised lines running from apex to middle. Elytra with rows of rather large, rounded punctures; carinæ of intervals interrupted as in *C. nenuphar*. Length 2.5—3 mm.

Plummer's Island, Md.; June 21. Recorded from Ohio, Illinois, District of Columbia and South Carolina. Occurs on *Urtica*. (*Ulke.*) A handsome, well marked little species, resembling a small *anaglypticus*.

750 (8735). CONOTRACHELUS ANAGLYPTICUS Say, 1831, 18; ibid, I, 282.

Broadly ovate, subdepressed. Piceous or dark reddish-brown, very thinly clothed with short, fine yellowish hairs, condensed to form two narrow lines each side of thorax, a broad oblique humeral spot or stripe on elytra and a broad band on apical half of femora; elytra also with a faint whitish band behind the middle. Beak scarcely as long as head and thorax, stout, strongly striate, carinate above. Thorax slightly longer than wide, sides nearly straight, disc very densely, rather finely reticulate-punctate and with two indistinct crests on apical half. Base of elytra twice as wide as thorax, truncate, humeri almost rectangular, sides converging from base to the obtusely rounded apex; strial punctures large, quadrate, close-set; alternate intervals rather strongly costate, the second costa widely interrupted at basal third. Abdomen coarsely and sparsely punctate. Length 3.5—4.7 mm. (Fig. 107.)

Fig. 107. × 8. (After Felt.)

Common throughout Indiana; May 12—July 5. Taken from asters and at electric light. Throughout New Jersey, May to Sept., under moist bark and on various bushes. Dunedin, Fla., Feb. 27—March 17. Abundant from New England to Michigan and Iowa, south to Florida and Texas. "Breeds in the fruit of hickory. (*Juglans.*)" (*Say.*) Beaten from quince. (*Knight.*) One specimen from Palos Park, Ill., has the pubescent markings of thorax, elytra and femora snow-white instead of yellowish.

751 (8736). Conotrachelus leucophæatus Fahr., Schön., 1837, 417.

Oval, robust. Piceous, rather thickly clothed with small oval, dark brown and whitish scales, the latter covering in great part the elytra and femora and forming two irregular lines each side of thorax; the former the disc of thorax, basal third and tips of elytra; antennæ, tibiæ and tarsi reddish-brown. Beak about as long as head and thorax, cylindrical, curved, carinate and striate on basal half. Thorax as wide at base as long, sides deeply sinuate; disc coarsely and roughly punctate, the median carina short, distinct. Elytra one-half wider at base and three times as long as thorax, humeri obtusely angulated; strial punctures rather small, deep; alternate intervals feebly costate, the first costa interrupted behind the middle, the second near base. Length 4.5—5 mm.

Lake County, Ind., rare; May 28. New Jersey, rare; Sept. 23. Described from Mexico; abundant in Texas; recorded from Kansas and Colorado. Pierce (1907, 275) states that at Dallas, Texas, it breeds in the stems of pig-weed, *Amaranthus*, and those of the flowering spurge, *Euphorbia corollata* L., the larvæ being found throughout the summer. Taken also on cotton, corn and oak.

Group V. (fissunguis group.)

This group contains a single species, having the beak stout, slightly curved, as long as head and thorax, shining near tip, carinate and coarsely striate on basal two-thirds; antennæ inserted one-fifth from its tip; elytra partly clothed with very fine short pubescence, the intervals each with a row of very short bristles; femora with a short dull tooth; tarsal claws cleft at tip.

752 (8737). Conotrachelus fissunguis Lec., 1876, 234.

Broadly oval, robust, convex. Dark brown; elytra in great part densely clothed with short yellow pubescence, darker near apex, a short denuded blackish band crossing the suture about the middle; femora annulated with yellow pubescence; antennæ, tibiæ and tarsi paler. Thorax as long as wide, sides slightly rounded, feebly constricted near apex; disc very coarsely and deeply punctured and with longitudinal ridges near the tip, the middle one more distinct. Elytra at base one-half wider than thorax,

sides parallel, then obliquely narrowed to apex; disc with rows of large distant punctures; intervals wide, flat. Abdomen coarsely punctured. Length 5—5.5 mm.

Occurs in New Jersey along shore in mallow swamps; July—October. Nelson County, Va., July 31. Ranges from New Jersey and District of Columbia to Louisiana, breeding in the seed pods of the swamp rose-mallow, *Hibiscus moscheutos* L.

GROUP VI. (ERINACEUS GROUP.)

Small, less robust species easily known by the pubescence being mixed with long, stout, erect bristles; beak rather slender, longer than head and thorax, slightly curved, feebly striate, finely and sparsely punctate; antennæ inserted one-fourth from its tip; elytra not costate; femora armed with a single tooth; claws deeply cleft, the tooth being as long as the outer part.

KEY TO SPECIES OF GROUP VI.

a. Thorax wider than long, very coarsely, deeply and densely punctate. 753. ERINACEUS.

aa. Thorax not wider than long, not cribrately punctate.. 754. HISPIDUS.

753 (8738). CONOTRACHELUS ERINACEUS Lec., 1876, 235.

Oval. Dark reddish-brown; elytra densely clothed with short, grayish-yellow hair-like scales, with a few small patches of white scales intermixed; thorax with two narrow lines of yellowish scales each side, the erect bristles shorter than those of elytra; legs, antennæ and beak brown. Thorax a little wider than long, sides nearly parallel, feebly narrowed and constricted near apex. Elytra nearly one-half wider than thorax, base truncate, humeri abruptly rounded; disc with rows of large shallow punctures, usually hidden by the scales; intervals slightly convex. Beneath shining, sparsely pubescent, coarsely, not densely punctured. Length 2.8—3.2 mm.

Frequent in southern Indiana; Lake County only in the north; April 19—Oct. 18. Occurs mainly beneath rubbish along the banks of streams; also on hickory. Ranges from Ohio and northern Indiana to District of Columbia, Florida and Texas. Taken on cotton and *Baptisia* in Texas. (*Pierce.*)

754 (8739). CONOTRACHELUS HISPIDUS Lec., 1876, 235.

Similar to *erinaceus* but smaller. Brown, covered with cinereous scaly pubescence, mixed with bristles which are as long on thorax as on elytra; beak, antennæ and legs pale brown. Thorax not wider than long, coarsely punctured. Elytra one-third wider than thorax, more elongate than in *erinaceus*. Femoral tooth smaller and more acute. Length 2.5 mm.

Recorded only from District of Columbia and Georgia; rare.

III. Rhyssematus Schön., 1837. (Gr., "rough" + "skin.")

Oval, convex, robust, nearly glabrous, black or dark brown species, having the beak shorter than head and thorax, cylindrical, moderately curved; funicle 7-jointed, two basal joints rather longer, 3—7 much shorter; thorax wider than long, scarcely narrower at base than elytra, strongly narrowed near apex, disc strigose with raised lines; femora toothed beneath; tibiæ with an acute tooth near apex. Occur mostly on milkweed (*Asclepias*), the larvæ breeding in the seed-pods and pupating in the ground. The species have been treated by

Horn, G. H.—Proc. Am. Phil. Soc., XIII, 1873, 463.
Casey, T. L.—Ann. N. Y. Acad. Sci., VIII, 1895, 832.

KEY TO EASTERN SPECIES OF RHYSSEMATUS.

a. Elytra with pale brown pubescent spots; strigæ of thorax strongly oblique; scutellum densely hairy. 755. PALMACOLLIS.
aa. Elytra wholly black or piceous; scutellum nearly glabrous.
b. Alternate elytral intervals more strongly carinate; humeral carinæ short.
c. Thorax with sides subparallel near base, its strigæ not oblique; larger, 5.5—6.5 mm. 756. LINEATICOLLIS.
cc. Thorax with sides converging from base to apex, its strigæ more or less oblique and converging toward the middle; smaller, 4.8—5 mm. 757. ANNECTANS.
bb. Elytral intervals nearly equal, feebly carinate, the humeral carinæ entire; strigæ of thorax oblique; smaller, not over 4 mm. 758. ÆQUALIS.

755 (8741). Rhyssematus palmacollis Say, 1831, 16, 27; ibid, I, 279, 295.

Short, oval, robust. Black, feebly shining, elytra obsoletely spotted with brownish, especially near apex, the spots slightly pubescent; scutellum densely clothed with brownish hairs. Beak as long as thorax, rather stout, slightly widened, somewhat flattened and sparsely punctured near tip; its basal two-thirds striate, finely carinate above. Thorax nearly twice as wide at base as long, sides gradually curved from base to apex; disc with a fine median carina and numerous oblique strigæ radiating therefrom. Elytra with suture and each alternate interval acutely carinate, with two rows of coarse, deep oblong punctures between the carinæ. Body beneath coarsely, abdomen and legs more finely and densely, punctured, each puncture bearing a short yellowish hair at bottom. Length 4.5—5.7 mm.

Vigo, Posey, Crawford and Clark counties, Ind., scarce; April 6—Sept. 27. Taken beneath drift in low ground in April; from goldenrod in September. Lake Okeechobee, Fla., March 1. A member of the Austroriparian fauna, ranging from District of Columbia and southern Ohio to Florida and Texas. Bred by Dr.

J. C. Arthur from galls caused by a fungus (*Cystopus*) on the wild sweet potato, *Ipomœa pandurata* L., and stated by Pierce (1916) to breed in the seed-pods of *Ipomœa sinuata* Ort., in Texas.

756 (8742). RHYSSEMATUS LINEATICOLLIS Say, 1824, 313; ibid, II, 175.

Larger and more robust. Elytra entirely black without brownish pubescent spots; antennæ and tarsi dark reddish-brown. Beak more strongly striate and acutely carinate on basal half. Thorax more than twice as wide as long, sides strongly curved, apex scarcely constricted, surface with deep strigæ, longitudinal and nearly parallel with the median line, becoming slightly curved near the sides. Length 5.5—6.5 mm.

Tippecanoe and Vermillion counties, Ind., scarce; June 13. Near New York City, many records; West Point to Anglesea; June—Aug. Ranges from Massachusetts to Michigan and Kansas, south to Florida and Texas. Breeds in the seed pods of several species of milkweed (*Asclepias*).

757 (——). RHYSSEMATUS ANNECTANS Casey, 1895, 834.

Narrowly oval. Black, feebly shining; antennæ and tarsi pale reddish-brown, club dusky. Head thickly clothed with yellowish hairs, finely and densely punctate. Beak about as long as head and thorax, nearly straight, sculptured as in *lineaticollis*; antennæ inserted at apical third. Thorax about twice as wide as long, sculptured as described in key. Elytra oblong-oval, almost one-fourth wider at base and about three times as long as thorax; strial punctures large, quadrate, alternate intervals strongly carinate. Under surface more finely and densely punctate than in the preceding. Length 4.8—5 mm.

Lake and Vigo counties, Ind., scarce; May 29—30. Taken beneath cover in sand. Chicago, Ill., July 20. Known only from Ohio, Indiana and Illinois. Recorded by Dury as abundant on and eating out the heads of swamp milkweed, *Asclepias incarnata* L., May 24. Close to but probably distinct from *lineaticollis*, especially in its more narrow form and oblique thoracic strigæ.

758 (8743). RHYSSEMATUS ÆQUALIS Horn, 1873, 464.

Oblong-oval, robust. Black, feebly shining; antennæ and tarsi reddish-brown. Beak sparsely punctured in front, basal half striate-punctate, not carinate. Thorax at base one-third wider than long, sides curved, feebly constricted near apex, disc with fine oblique strigæ, a few punctures along apical and basal margins. Elytra oval, feebly narrowed at apex, disc with rows of coarse, deep, elongate punctures; intervals nearly flat, each with two irregular rows of very fine punctures bearing minute yellowish bristles. Beneath coarsely, abdomen very densely and more finely punctured. Length 3.3—4 mm.

Not yet recognized from Indiana, though it should occur. Enterprise, Miss., June 11. Recorded from Cincinnati, Ohio. Beverly Hill, Chicago, Ill., May 21. Ranges from Pennsylvania, Iowa and Kansas, south to District of Columbia and Mississippi. Not rare by beating the great ragweed, *Ambrosia trifida* L., in August. (*Hamilton.*) The alternate intervals are distinctly more carinate in the Chicago specimens.

IV. CHALCODERMUS Schön., 1837. (Gr., "bronze" + "skin.")

Oval, robust, convex species, usually with a coppery or bronze lustre and having the beak more slender than in *Rhyssematus*, as long as or longer than thorax; elytral intervals not carinate, the outer striæ as mentioned in key; femora toothed; tibiæ without a tooth on outer edge near apex, the front ones narrower at basal third. *Chalcodermus spinifer* Boh. of the Florida list is *Sternechus armatus* Casey, the identification as *C. spinifer* by Dr. LeConte having been erroneous.

KEY TO EASTERN SPECIES OF CHALCODERMUS.

a. Thorax coarsely punctured, not strigose; body black. 759. ÆNEUS.
aa. Thorax deeply strigose.
b. Body brown, elytra paler; thoracic strigæ regular. 760. COLLARIS.
bb. Body black; thoracic strigæ irregular. 761. INÆQUICOLLIS.

Fig. 108. *a*, Beetle; *b*, larva; *c*, head of larva; *d*, pupa. *a*, *b* and *d* × 5. (After Chittenden.)

759 (8746). CHALCODERMUS ÆNEUS Boh., Schön., 1837, 388.

Oval, convex, robust. Black, finely alutaceous, usually with a bronze tinge. Beak nearly straight, slightly longer than thorax, sparsely punctulate, feebly carinate; eyes very narrowly separated. Thorax one-fourth wider at base than long, suddenly narrowed in front, sides obtusely toothed behind the constriction, disc very coarsely and rather sparsely punctate. Elytra oval, convex, sides subparallel on basal half, then gradually narrowed to apex; disc with rows of large, deep, rather distant punctures; intervals alutaceous, each with a row of very fine punctures, each puncture bearing a very minute scale. Beneath coarsely, abdomen more sparsely, last ventral more densely, punctured. Length 4.8—5.5 mm. (Fig. 108.)

Posey County, Ind., rare, May 4. Dunedin, Fla., March 25—Apr. 11. Ranges from Maryland to Oklahoma, south to Florida and Texas. Known as the "cow-pea curculio," the larvae breeding in the pods of cow-peas and closely related legumes, sometimes attacking the stems of cotton and often mistaken for the cotton-boll weevil, *Anthonomus grandis* Boh. When full-grown the larva cuts a hole in the pod, drops to the ground and pupates at a depth of one to four inches beneath the surface. About a month is required from egg to maturity. The adults hibernate beneath rubbish and earth and emerge in May and June. One of the many interesting Austroriparian species that find their way up into southwestern Indiana.

760 (8748). CHALCODERMUS COLLARIS Horn, 1873, 467.

Form of *æneus*. Brownish with bronzed lustre, elytra reddish-brown, obsoletely marked with brownish spots. Beak more finely and sparsely punctured and eyes more widely separated than in *æneus*. Head minutely alutaceous, finely punctate. Thorax one-third wider at base than long, sides slightly sinuate in front, thence curved to base; disc strongly convex, deeply longitudinally strigose, finely punctured near apex. Scutellum small, smooth, bronzed. Elytra sculptured as in *æneus*. Length 4.7—5.5 mm. (Fig. 109.)

Fig. 109. × 5 (After Chittenden.)

Spencer Co., Ind., rare; June 14. Iona, Atlantic City, Sea Isle, Cape May and Anglesea, N. J., May 31—June 28, on *Cassia*. District of Columbia, June. Ormond, Fla., March 13—April 11; beaten from oak. Ranges from Massachusetts and New Jersey to Illinois, south to Florida and Texas. Occurs on the evening primrose, *Onagra biennis* L. in Illinois. (*Hart.*)

761 (8747). CHALCODERMUS INÆQUICOLLIS Horn, 1873, 466.

Oval, robust. Black with a distinct æneous tinge. Beak sparsely punctured at tip, feebly sulcate at sides near base, above obtusely sub-carinate. Head sparsely punctured, eyes moderately distant with a small impressed puncture between them. Thorax one-fourth wider at base than long, sides in front feebly sinuous, then broadly curved to base; median line carinate in front, suddenly widely so at middle; disc with deep broad irregular sulci near apex and on sides, these enclosing a large irregular smooth space each side near base; sides of thorax beneath with deep, broad, short grooves, while *æneus* has deep foveate punctures. Other characters as in *æneus*. Length 4.8—5.5 mm.

Dunedin, Fla., March 25; taken from the axils of the leaves of *Carduus spinosissimus* Walt. Recorded only from Georgia, Ft. Capron, Fla., and Arkansas.

V. Chaleponotus Casey, 1892. (Gr., "hard" + "back.")

Differs from *Chalcodermus* by characters given in key and by having the mandibles very thick, strongly curved; basal joint of funicle shorter than second, which is as long as the next two; elytral intervals elevated as in *Rhyssematus*.

762 (11,063). Chaleponotus elusus Casey, 1892, 444.

Oval, convex. Black, shining, glabrous, each puncture bearing a very minute seta. Beak rather slender, cylindrical, evenly curved, as long as head and thorax, finely, sparsely punctate, the antennæ inserted beyond its middle. Thorax subconical, one-fourth wider than long, sides broadly curved from base to the subapical constriction; disc finely, evenly, deeply not densely punctate, with a small smooth spot at middle. Elytra oval, one-third wider and two and a half times longer than thorax, humeri oblique; disc finely striate, the strial punctures small, deep, elongate, remote; intervals equal, strongly convex, each with a row of small punctures. Abdomen finely and sparsely punctate. Length 4 mm.

Described from a single Indiana specimen. Not known to us.

VI. Microhyus Lec., 1876. (Gr., "little" + "pig.")

Here belongs a single small brown ovate species, having the beak shorter than thorax, nearly straight, finely punctured; antennæ inserted one-third from its tip; scape scarcely reaching the eyes, funicle short, first joint longer and stouter, the others submoniliform, closely united; head inserted in thorax beyond the eyes in repose; postocular lobes absent; prosternum deeply emarginate in front, its pectoral groove deep; first ventral slightly longer than second, third and fourth shorter, fifth as long as second, flat, rounded behind; femora not toothed; last joint of tarsi as long as the others united.

763 (8752). Microhyus setiger Lec., 1876, 238.

Oval. Dark reddish-brown clothed with a crust of small, dark brown scales and bearing numerous stout erect bristles; antennæ and legs paler. Eyes small, widely separated. Thorax conical, gradually narrowed from the base, sides feebly rounded, broadly constricted near apex; sculpture hidden by the crust. Elytra broadly oval, one-half wider at base than thorax; striæ deep, alternate intervals a little wider and more convex. Beneath densely and coarsely punctured. Length 1.8—2.4 mm.

Marion and Posey counties, Ind., scarce; April 25—June 4. Beaten from dead branches of beech. Recorded from Pennsylvania, Ohio, District of Columbia and Georgia. Easily known by its small size, brown color and numerous prominent bristles, which are all erect in the specimens in hand, not reclinate on the elytra as stated by LeConte.

Subtribe II. Cryptorhynchi.

Species varying much in size and appearance but all agreeing in having the front coxæ separated, the beak lying between them in repose, the pectoral groove distinctly limited behind; tarsal claws simple, usually small. A new genus has been erected for *Acalles nuchalis* Lec., and two genera founded by Casey and one by Faust are also to be added to those recognized by LeConte and Horn. *Macromerus mœstus* Lec., J. E. (1824, 171) based on one specimen and not since recognized, has been dropped altogether. Dr. Schwarz, from the description only, considers it a synonym of *Cryptorhynchus parochus* Hbst.

KEY TO EASTERN GENERA OF SUBTRIBE CRYPTORHYNCHI.

a. Funicle of antennæ 6-jointed.
  b. Elytra with rectangular humeri; femora toothed; three middle ventral segments subequal in length; surface densely clothed with scales. VII. Euscepes.
  bb. Elytra oblong-oval with rounded humeri; femora unarmed; surface usually nearly glabrous; second ventral segment longer than third.
    c. Mesosternum with shallow emargination. VIII. Tyloderma.
    cc. Mesosternum protuberant. IX. Micralcinus.
aa. Funicle of antennæ 7-jointed.
  d. Thorax prolonged over the head.
    e. Scutellum invisible; tarsi moderately dilated, scarcely spongy beneath; second ventral segment longer than third and fourth combined. X. Lembodes.
    ee. Scutellum visible; third joint of tarsi dilated and bilobed as usual; tibiæ very short, not more than one-half as long as femora; second ventral segment long but not longer than third and fourth combined. XI. Paracamptus.
  dd. Thorax not prolonged over the head.
    f. Club of antennæ not annulated except near tip, solid or nearly so.
      g. Middle and hind tibiæ rapidly increasing in width from base to middle, then abruptly narrowed, the apical half not wider than base; antennal club as long as the preceding five joints united; form oblong-oval, unevenly clothed with scales. XII. Canistes.
      gg. Tibiæ normal, slender; process between the hind femora triangular; form pear-shaped, convex, thinly clothed with reclined bristles. XIII. Eurhoptus.
    ff. Club of antennæ annulated as usual.
      h. Tibiæ slightly spined at tip; ventral segments 2—4 subequal; form usually broadly oval. XIV. Pseudomus.
      hh. Tibiæ armed with a strong hook at tip.
        i. Second ventral segment much longer than third.
          j. Episterna of the metasternum very small, usually invisible; length rarely over 3.5 mm. XV. Acalles.

jj. Episterna of the metasternum distinct; second ventral twice as long as third; length 3.8—4 mm.
XVI. PSEUDOACALLES.

ii. Ventral segments 2—4 equal or nearly so.

k. Scutellum invisible; femora unarmed.

l. Form very broad; elytra dilated behind humeri.
XVII. GERSTÆCKERIA.

ll. Form slender, oblong-oval; base of thorax strongly bisinuate.
XVIII. APTEROMECHUS.

kk. Scutellum visible; femora sulcate beneath, usually armed.
XIX. CRYPTORHYNCHUS.

VII. EUSCEPES Schön., 1844. (Gr., "beautiful" + "vestiture.")

Elongate subparallel species, having the funicle 6-jointed, the first and second joints elongate, three to six short, subglobose; second ventral segment longer than either third or fourth, which are subequal and together equal in length to fifth; middle and hind coxæ more widely separated than in *Acalles*. One species occurs in Florida.

764 (8770). EUSCEPES PORCELLUS Boh., Schn., 1844, 430.

Elongate, subcylindrical. Brown, densely clothed with dark brown and clay-yellow scales, the latter covering the basal and apical thirds of elytra. Beak of male stout, shorter than thorax, striate, finely carinate, densely scaly; of female more slender, one-third longer, glabrous and shining near tip. Thorax slightly longer than wide, widest at middle, sides feebly rounded, sculpture hidden by scales. Elytra oblong, one-fourth wider at base than thorax, humeri prominent, sides nearly parallel; less obliquely narrowed and more broadly rounded behind than usual; strial punctures large, round, close-set; intervals narrow, convex, each with a row of rather long, slender, pale erect setæ. Under surface sparsely but evenly covered with large oval whitish scales. Length 2.3—2.7 mm.

Pelican Bay, Lake Okeechobee, March 1—March 6; common beneath decaying stems of the water hyacinth, *Piaropus crassipes* Mart., next to the water's edge. Biscayne, Miami, Enterprise and Cape Sable, March—May. *Acalles longulus* Lec. (1876, 244) is a synonym. Both LeConte and Pierce include this erroneously among the species with 7-jointed funicle.

VIII. TYLODERMA Say, 1831. (Gr., "rough" + "skin.")

Oblong or oblong-oval, usually nearly glabrous species of a dark color, having the beak short and stout, the apex of the pectoral groove receiving it in repose therefore not extending so far into the mesosternum and rendering the emargination of that segment more shallow; eyes small, widely separated, both they

and the antennæ almost hidden by the prominent postocular lobes and the sides of the deep pectoral groove; thorax longer than wide, rounded in front; metasternum long, with distinct though narrow side pieces; second ventral segment longer than third; femora rather slender, unarmed; third tarsal joint dilated, bilobed; tarsal claws small, free, simple. Our species are for the most part stem borers, the larva pupating in its feeding cell. For literature pertaining to them the student is referred to

Horn, G. H.—Proc. Am. Phil. Soc., XIII, 1873, 467—469. (*Analcis.*)

Casey, Thos. L.—"Coleopterological Notices, IV—Tyloderma" —*in* Ann. N. Y. Acad. Sci., VI, 1892, 448—457.

KEY TO EASTERN SPECIES OF TYLODERMA.*

a. Body more or less dull, very coarsely, deeply sculptured; thorax with large uneven foveæ. 765. FOVEOLATA.

aa. Body smoother and more shining; thorax punctate rather than foveate.

b. Elytra rather thickly clothed with pale yellowish and whitish scales which are condensed in four oblong patches at base and numerous small transverse spots scattered over the surface. 766. MACULATA.

bb. Elytra glabrous, or very sparsely and unevenly pubescent.

c. Elytra oval, widest near basal third; thorax very deeply and densely punctate; surface reddish-brown. 767. FRAGARIÆ.

cc. Elytra becoming parallel and straight at sides towards base.

d. Surface reddish brown or paler; thoracic punctures coarse, uneven and impressed.

e. Thorax rather longer than wide, more closely and finely punctured near apex; elytra piceous, sparsely mottled with rufous, sometimes almost wholly rufous, the rows of punctures regular. 768. VARIEGATA.

ee. Thorax scarcely longer than wide, more widened toward base; sparsely and unevenly punctate; elytra wholly reddish-brown, the punctures in irregular rows toward base. 769. RUFESCENS.

dd. Surface black or piceous-black, often bronzed, rather shining, wholly glabrous; thorax more or less minutely punctate.

f. Elytral humeri very narrowly exposed at base. 770. BARIDIA.

ff. Elytral humeri broadly exposed.

g. Punctures of thoracic disc strong though sparse throughout; body rather robust. 771. NIGRA.

gg. Punctures of thoracic disc very fine or subobsolete; body narrower.

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*Casey, from whose paper the following synopsis is mainly condensed, states that *T. longa* Lec. belongs to *Cryptorhynchus.*

h. Punctures of thoracic flanks strong and unevenly distributed over the entire surface. 772. ÆREA.

hh. Punctures of the flanks entirely obsolete, except in the subapical constriction. 773. PUNCTATA.

765 (8779). TYLODERMA FOVEOLATA Say, 1831, 19; ibid, I, 284.

Oblong. Black, opaque antennæ and tarsi dark reddish-brown; surface with small patches of dirty whitish hair-like scales on middle of vertex, between the eyes, and at apex of thorax, a curved row each side of thorax from before the middle to near the sides of base; elytra also with numerous irregular spots on disc and a broad uneven band at apical fourth. Beak not longer than head, broad, coarsely punctate; head more finely and sparsely punctate, with a deep frontal groove. Thorax slightly wider than long, sides strongly rounded, disc with very coarse, deep, uneven, rather close-set punctures, their intervals finely alutaceous. Elytra at base not wider than thorax at middle; sides parallel to apical third, thence rounded to tips; disc with irregular rows of large, deep, uneven foveæ, becoming obsolete toward apex. Length 3—5.8 mm.

Common throughout Indiana on evening primrose; March 12—Nov. 7. Hibernates beneath boards and rubbish. Throughout New Jersey, May—July. West Point, N. Y. Ranges from New England to Michigan and Nebraska, south to Florida. Breeds in the stems of the evening primrose, *Onagra biennis* L., and the willow herb, *Epilobium*. Varies much in size, (a specimen in hand being scarcely 3 mm. in length), and in sculpture, the punctures of elytra being sometimes in regular rows, again very unevenly distributed.

766 (——). TYLODERMA MACULATA sp. nov.

Elongate-oval, robust. Dark reddish-brown; head and thorax thinly clothed with prostrate hair-like scales; elytra rather thickly maculate with similar condensed scales as described in key; antennæ and tarsi pale reddish-brown. Beak nearly as long as head and thorax, carinate, finely striate, coarsely and densely punctate. Head finely and rather closely punctate and with a small, round, deep fovea between the eyes. Thorax scarcely wider than long, sides broadly rounded, feebly narrowed in front, disc densely, coarsely and evenly punctate. Elytra oval, one-fourth wider at base than thorax, humeri rounded, sides feebly converging from base to behind middle, then more rapidly to the obtuse apex; striæ with regular rows of rather fine rounded punctures; intervals feebly convex. Under surface and legs rather finely and sparsely punctate, each puncture bearing a fine grayish prostrate hair. Length 4.5 mm. (*W. S. B.*)

Little River, Florida, rare; March 17. The maculate elytra and deep frontal fovea easily distinguish this from all other described species. The sculpture of thorax is quite similar to though coarser than that of *fragariæ*, but the elytra are of very different shape.

767 (8781). TYLODERMA FRAGARIÆ Riley, 1871, 42.

Oblong-oval, convex. Piceous, elytra and legs reddish-brown, the former with a transverse blackish spot on each near base, a second near middle and another smaller at apical fourth; the basal one often absent; pubescence very sparse, yellowish, condensed near middle of elytra in an oblique band and again at apical third. Beak longer than head, both densely and coarsely punctured. Thorax as long as wide, sides broadly rounded, disc coarsely, evenly and densely punctured. Elytra at base not wider than middle of thorax, widest at basal third; disc with rows of distant punctures, coarse toward base, small toward apex; intervals feebly convex, minutely punctate. Length 3.5—4.2 mm.

Fig. 110. *a*, Larva; *b*, side view of adult; *c*, beetle × 6. (After Riley.)

Tippecanoe, Floyd and Spencer counties, Ind., scarce; April 4—May 24. Arlington and Maplewood, N. J., under stones; Apr. —June. Ranges from New Jersey to northern Illinois, south to District of Columbia. Known as the "strawberry crown-borer," the larvæ breeding in the crowns and roots of strawberry, feeding on the tissues and woody portions, so that the plant easily breaks off and is heaved out of the ground by frost. (*Riley.*) Burning over the beds after the fruit is gathered is recommended as a remedy.

768 (8780). TYLODERMA VARIEGATA Horn, 1873, 468.

Oblong. Piceous, shining; thorax feebly rufescent near apex; elytra piceous with small, scattered reddish-brown patches, which are very sparsely clothed with yellowish-white hair-like scales; sometimes reddish-brown with piceous patches. Beak of female longer than head, narrower than in *foveolata*, coarsely and sparsely punctate; frontal fovea small, faint or obsolete. Thorax slightly longer than wide, sides broadly rounded, converging and feebly constricted toward apex; disc finely alutaceous, sparsely, coarsely and rather unevenly punctate, the punctures finer toward apex and on sides. Base of elytra one-third wider than that of thorax, sides parallel and nearly straight to apical fourth; disc with regular rows of larger distant punctures. Beneath coarsely and sparsely punctate. Length 3—4.2 mm.

Brown County, Ind.; April 29, on apple trees. Lake Okeechobee and Baldwin, Fla., March 2—June 10; beneath drift on sandy beach. Ranges from Michigan and Illinois to and throughout the Gulf states. The two Okeechobee specimens both have the elytra largely reddish-brown, with scattered piceous spots.

769 (11.070). TYLODERMA RUFESCENS Casey, 1892, 454.

Close to *variegata;* form slightly more oval. Dark reddish-brown, elytra with paler spots and with the yellowish pubescence arranged in a narrow median and a wider oblique post-median band. Beak shorter, both it and thorax more coarsely and unevenly punctate. Length 3.2—4.3 mm.

Knox County, Ind., rare; July 4. Recorded only from Indiana by Casey.

770 (8784). TYLODERMA BARIDIA Lec., 1876, 249.

Oval, gradually pointed behind. Black, feebly tinged with bronze; finely alutaceous. Beak and head rather finely and deeply punctate; frontal fovea small, feeble. Thorax slightly wider than long, apex much narrower than base, disc finely but deeply, remotely and evenly punctate. Elytra very slightly wider at base than thorax, disc with rows of small, remote punctures becoming nearly obsolete towards apex; intervals each with a row of very fine punctures bearing minute white hairs. Length 3.8—4.2 mm.

Recorded from Florida and Texas. "Easily known by the oval, posteriorly pointed form and feebly exposed humeri." (*Casey.*) Taken on cotton at Hemphill, Texas, April 1. (*Pierce.*)

771 (——). TYLODERMA NIGRA Casey, 1884, 56.

Broadly oval, robust. Black with bluish or bronzed metallic lustre, polished. Beak and head opaque, the former shorter than head, very broad, its punctures dense and coarse; head sparsely and finely punctate and with an elongate frontal fovea. Thorax slightly wider than long; sides parallel from base to middle, then strongly converging to apex; disc sparsely and finely, sides much more coarsely and rather thickly punctate. Elytra at base one-third wider than thorax, sides feebly converging from base to apex; disc with rows of rather fine, distant punctures, which become obsolete behind the middle. Length 3—3.7 mm.

Fountain, Marion, Lawrence and Posey counties, Ind., scarce; May 15—June 17. Rogers Park, Ill., June 26. Irvington and Arlington, N. J.; Jan.—June. Differs from *ærea* in its "larger size, more robust form, much coarser punctures of thorax and elongate fovea of vertex." (*Casey.*)

772 (8783). TYLODERMA ÆREA Say, 1831, 29; ibid, I, 297.

Narrowly oval, convex. Black, strongly bronzed, highly polished, the head, beak and legs dull. Beak as long as head, both finely and rather densely punctate; frontal fovea obsolete. Thorax slightly wider than long, widest at middle, thence feebly narrowed to base, more strongly toward apex; disc minutely alutaceous, very finely and sparsely punctate; sides more coarsely and closely punctate, each puncture with a minute seta. Elytra at base two-fifths wider than thorax, sides nearly parallel from base to middle, then gradually converging to apex; disc with rows of fine, remote punctures, which are wanting on apical third. Length 2.2—2.8 mm.

Frequent throughout Indiana; Jan. 6—Sept. 25. Taken by sweeping and beneath rubbish, usually near water. Throughout New Jersey, March—July, not rare. West Point, N. Y., on evening primrose. Black Mountains, N. C., June—August. Lake Okeechobee, Fla., March 2. Ranges from Canada and New England to Michigan and Iowa, south to Florida and Texas. Occurs on plants growing in bogs. (*Uhle.*) The punctures of elytral rows in most specimens at hand extend to the middle or beyond.

773 (——). Tyloderma punctata Casey, 1884, 57.

Elongate-oval, strongly convex. Black with a strong bronzed lustre, polished, glabrous. Thorax as long as wide, sides almost converging from base to apex, slightly curved on middle third; disc almost impunctate, the upper portion toward the base with minute sparse punctures; a transverse area just behind apex, distinctly and confusedly punctate; the punctures becoming large and deep in a still narrower and more apical line in the constriction of the sides. Elytra with rows of coarse, unimpressed, remote punctures, becoming obsolete behind the middle. Length 3.5—4 mm.

Southern two-thirds of Indiana, scarce; May 8—Oct. 9. Taken beneath oak bark in May, and in a decaying fungus at the base of a red oak stump in October. Irvington and Lakehurst, N. J., June 21—July 12. Peekskill, Nyack and Yonkers, N. Y. Dunedin, Fla., Jan. 15. Ranges from New England to Illinois, south to Florida. Larger than *arca* and with very different punctuation of thorax. A small form, 2.3—3 mm. in length, with both thorax and elytra almost impunctate, occurs abundantly in winter, mating in February and March, beneath boards along the margins of lakes and ponds near Dunedin and other points in Florida.

IX. Micralcinus Lec., 1876. (Gr., "small" + Analcis.)

Here belongs a single small southern species having the postocular lobes prominent; elytra not suddenly wider than thorax but regularly oval, their base emarginate; mesosternum protuberant and perpendicular in front, femora slender, sinuate beneath, not toothed; claws small, divergent, simple.

774 (8740). Micralcinus cribratus Lec., 1876, 236.

"Oval. Blackish-brown, shining, sparsely pubescent; elytra mottled with small spots of fine gray hair and with patches of a brown color toward the tips; antennæ reddish-brown. Beak rather stout, scarcely as long as thorax, deeply grooved and punctured. Thorax as long as wide, rounded on sides, narrowed in front, cribrate with large, deep punctures and with a small, smooth callus at middle. Elytra one-third wider than thorax, humeri rounded; striæ composed of large deep punctures, becom-

ing smaller towards tip. Beneath strongly, not densely punctured. Length 3.2 mm." (*LeConte.*)

Described from Capron, Fla. Resembles *Tyloderma variegata* Horn in color and general appearance. Known to us only by the type in LeConte collection, which has 6-jointed funicle as confirmed by Mr. Samuel Henshaw's recent examination.

X. Lembodes Schön., 1844. (Gr., "boat" + "like.")

Beak somewhat longer than head, subcylindrical, nearly straight; first and second joints of funicle longer than the others, obconic, third one-half shorter, 4—7 short, loosely jointed, gradually wider; club short, oval, annulated; eyes rounded, depressed, separated by the width of beak; suture between first and second ventrals obsolete; femora unarmed; tarsi moderately dilated, scarcely spongy beneath.

775 (8755). Lembodes solitarius Boh., Schn., 1844, 437.

Elongate-oblong, slender. Black, densely clothed with a grayish spongy crust which usually conceals the sculpture; thorax with indistinct median and lateral paler stripes; elytra with a faint crossbar of whitish scales behind the middle; antennæ reddish-brown. Beak finely and rather closely punctate, shining toward tip. Thorax oblong, sides straight; disc uneven, widely impressed behind the apex, densely and finely punctate and with tufts of stout setæ toward the front. Elytra elongate, convex, scarcely wider at base than thorax, widest behind the middle; sides nearly straight, feebly converging from middle to the obtuse apex; disc coarsely striate-punctate; alternate intervals slightly more convex, each with a row of short, stout setæ. Length 4—4.8 mm.

Cape Jupiter, Key West, Punta Gorda and St. Lucie, Fla.; April 4—Sept. 17. Described from Guadeloupe.

XI. Paracamptus Casey, 1895. (Gr., "near" + Acamptus.)

Beak three-fourths the length of thorax, nearly straight, completely concealed in repose in the long, deep pectoral groove; funicle 7-jointed, first and second joints elongate, the first the longer; scutellum small, distinct, acutely elevated; metasternum elongate, its episterna distinct; first and second ventral segments long, third and fourth short, fifth nearly as long as the two preceding; femora unarmed; tibiæ as in key, ending in a strong curved spur; third joint of tarsi dilated and bilobed; claws short, stout, simple, divergent.

776 (——). Paracamptus subtropicus Casey, 1895, 837.

Elongate-oblong, strongly convex. Black, densely clothed on body and legs with a thick grayish, felt-like crust bearing sparse subclavate setæ which are distinct on thorax, very short and distinct only on the elevated

intervals of elytra; the latter with an elongate, subdenuded blackish spot behind the scutellum and transverse rows of small darker spots near the middle and at apical third. Beak piceous, naked except near base, shining, punctate. Thorax as long as wide, sides parallel near base, narrowed and sinuate toward apex which is strongly and evenly rounded. Elytra slightly wider at base than thorax, one-third longer than wide, sides parallel and nearly straight, the apex broadly rounded; disc finely striate, not distinctly punctate; alternate intervals strongly elevated, their crests nearly flat. Length 2.2—3 mm.

Punta Gorda, Fla. The thorax in some specimens is darker with a fine median line and wider lateral stripe paler.

XII. Canistes Casey, 1892.

Beak slightly shorter than thorax, the pectoral groove for its reception in repose deep and reaching almost to metasternum; eyes rather small, almost concealed in repose; antennæ inserted behind middle of beak; funicle 7-jointed, first joint slightly shorter than second, which is nearly as long as the next three; metasternum very short, its episterna distinct, epimera not visible; second ventral much longer than the next two together; legs stout, robust, femora unarmed, tibiæ as mentioned in generic key; tarsi short, slender, the third joint dilated, bilobed; claws small, simple, free and divergent.

777 (11,067). Canistes schusteri Casey, 1892, 447.

Oblong-oval, strongly convex. Black, unevenly clothed with small yellowish or brownish scales, which are dense on the head and legs, more elongate and thinly placed on sides of thorax, and very widely scattered on elytra, visible more especially near base, in a transverse line at apical third and back of it along the suture. Beak feebly curved, shining, finely and sparsely punctate in apical two-thirds, punctate and scaly near base. Thorax at middle slightly wider than long, sides nearly straight on basal half, then strongly narrowing to apex; disc with a wide, deep, transverse constriction near apex, coarsely, deeply and densely punctate. Elytra scarcely wider than thorax, disc not striate, the punctures very fine and sparse, more coarse and in rows very near the base. Length 3.3 mm.

Rockhaven, Ky. St. Louis and Sedalia, Mo. Cincinnati, Ohio, July 12; two specimens. "They were standing high up on their clumsy legs in a patch of dark colored fungus, at which they were gnawing, which was on the under side of a beech log in thick woods." (*Dury.*)

XIII. Eurhoptus Lec., 1876. (Gr., "handsome" + "club.")

Beak stout, rather depressed, as long as thorax, finely punctured, naked at tip; second joint of funicle slightly longer than

third, 3—7 equal, short, closely united; first ventral with a deep, triangular polished impression; femora not toothed; tibiæ slender, straight, spined at tip; tarsi with third joint broadly bilobed.

778 (8754). Eurhoptus pyriformis Lec., 1876, 245.

Pear-shaped, convex, robust. Dull black, thinly clothed with pale reclined bristles; antennæ and tarsi reddish-brown. Thorax not wider than long, narrowed from the base, sides straight, disc feebly impressed one-third from apex, densely and rather coarsely punctate. Elytra connate, fitting closely to thorax, their sides strongly rounded; strial punctures very large, rather distant; intervals near the suture somewhat convex. Length 2—2.4 mm.

Described from Illinois. In Horn collection from Pennsylvania, Kentucky, Missouri and Colorado. Known also from Iowa and Texas.

XIV. Pseudomus Schön., 1837. (Gr., "false" + "humerus.")

Beak as long as thorax, more slender than in *Acalles*, cylindrical, moderately curved; funicle 7-jointed, two basal joints longer, obconical, the others short, subrotund; club oblong-ovate, acuminate; eyes narrowly separated, ovate, flattened; elytra suboval, 10-striate, their base scarcely wider than thorax, humeri and setæ obsolete; mesosternum deeply emarginate; metasternum nearly or quite as long as the first ventral, its episterna indistinct; tibiæ straight, slightly spined at tip; tarsi with third joint broadly dilated, their claws simple.

KEY TO SPECIES OF PSEUDOMUS.

a. Front femora toothed.

b. Elytra with a large postmedian white spot crossing the suture, and prolonged backward on it nearly to tip; claws divergent. 779. truncatus.

bb. Elytra brown without spot as above; claws connate nearly to tip. 780. inflatus.

aa. Femora not toothed; elytra with a large white spot on declivity. 781. sedentarius.

779 (8775). Pseudomus truncatus Lec., 1876, 246.

Subovate. Dark brown, above thinly clothed with small brown scales; beneath with yellowish scales; elytra with an irregular basal cross-bar and a large common spot behind the middle, white. Beak nearly smooth at tip, punctured and feebly striate at base. Thorax wider than long, narrowed from base forward, sides nearly straight; disc convex, not densely punctured, with a median line and a small spot each side smooth. Elytra with rows of large distant punctures. Femora obtusely toothed. Length 4.6 mm.

Described from South Carolina and Georgia. Recorded, perhaps erroneously, from Ontario by Harrington.

780 (8777). PSEUDOMUS INFLATUS Lec., 1884, 31.

Broadly oval, convex, narrowed at each end. Piceous, thinly clothed with brown submetallic scales, condensed to form a lunate transverse spot behind the middle. Beak rugose and punctured at base, finely and sparsely punctate toward tip. Thorax one-half wider than long, strongly narrowed in front, equally punctate above and beneath, without smooth dorsal line. Elytra with rows of close-set, quadrate punctures. Front femora acutely toothed, hind ones with a very obtuse angle. Length 4—4.2 mm.

Cape Jupiter and other points in Florida. "Easily recognized by the inflated form and nearly uniform color." (*LeConte.*) Referred by Champion to his genus *Pseudomopsis*, but the scutellum is plainly visible and the humeri are not rectangular.

781 (8776). PSEUDOMUS SEDENTARIUS Say, 1831, 30; ibid, I, 298.

Elongate, subfusiform, convex. Black or piceous, very thinly clothed with large oval, dirty white or yellowish scales, condensed in numerous small spots on thorax and elytra and in a large common one on declivity, which is prolonged backward by two spurs to the tip; antennæ and tarsi reddish-brown; scutellum white. Beak black, shining, coarsely punctate near base, finely and sparsely so near tip, obsoletely carinate. Thorax as wide at base as long, strongly narrowed from base to apex, disc rather coarsely, deeply and very closely punctate and with a short, faint median carina. Elytra strongly convex, the striæ with rows of large, feebly impressed, close-set oblong punctures. Length 4—4.5 mm.

Known only from Florida. Ormond, Apr. 13. "Enterprise, very rare on dead vines." (*Schwarz.*)

XV. ACALLES Schön., 1826. (Gr., "deformed.")

Small, convex, dull colored species having the beak rather long, subcylindrical, moderately curved, somewhat flattened toward apex; antennæ inserted at or behind the middle, first and second joints of funicle elongate, obconical, the others short, subrotund; elytra oval with rounded sides, 9-striate, their scales intermixed with bristles; mesosternum usually deeply emarginate for about one-half its length, the prosternal groove ending at the front of the middle coxæ. About 17 species have been described from this country, mostly from the southern and southwestern states. Of these eight are known from our territory and four additional ones are herewith described.

KEY TO EASTERN SPECIES OF ACALLES.

a. Thorax not channeled; mesosternum deeply emarginate.
b. Thorax with nearly entire median carina.
c. Middle of thorax narrower than base of elytra, its disc without a T-shaped white mark.
d. Form elongate-oval; length 4 mm. 782. CARINATUS.
dd. Form short-oval, very robust; length 2.5 mm. 783. INFLATUS.
cc. Middle of thorax as wide as base of elytra, its disc with a T-shaped white mark. 784. GRANOSUS.
bb. Thorax not carinate or with a feeble carina on apical half.
e. Elytra unicolorous dull gray or brown.
f. Bristles of elytra soft, slender, strongly recurved; striæ deep, narrower than the intervals. 785. SORDIDUS.
ff. Bristles short, straight, feebly inclined; intervals narrower than the large punctures forming the striæ. 786. POROSUS.
ee. Elytra with markings of pale scales.
g. Thorax one-third or more wider than long, wider than base of elytra; bristles very short; larger, 3.7 mm. 787. SUBHISPIDUS.
gg. Thorax not or scarcely wider than long, never wider than base of elytra; bristles longer, clavate; length less than 3.3 mm.
h. Pale scales of elytra arranged to form two more or less regular cross-bands, the front one sometimes of isolated spots.
i. Smaller, not over 2.5 mm.; thorax slightly longer than wide.
j. Pale scales in part white or whitish, arranged in two more or less interrupted bands. 788. CLAVATUS
jj. Pale scales yellowish, forming a broad basal and post-median band across the elytra. 789. CRASSULUS.
ii. Larger, 3.2 mm.; thorax wider than long, as wide at middle as base of elytra; bands of elytra formed of small, widely separated white spots. 790. SYLVOSUS.
hh. Pale scales of elytra scattered irregularly, not arranged to form white bands; length less than 2.5 mm. 791. MINIMUS.
aa. Thorax distinctly channeled; mesosternum broadly and shallowy sulcate.
k. Form rather slender; median channel of thorax narrower; elytral striæ fine. 792. PECTORALIS.
kk. Form very robust; median channel broad, deep; elytral striæ wide. 793. VENTROSUS.

782 (8763). ACALLES CARINATUS Lec., 1876, 242.

Elongate-oval. Black, densely covered with dark brown and pale scales, the latter forming on the elytra some indistinct transverse lines, and an oblique zigzag band about the middle. Thorax as long as wide, sides strongly rounded; disc widest at middle, much narrower in front, broadly not deeply constricted near tip, coarsely and densely punctured. Elytra oval, at widest part scarcely wider than thorax at middle, sides rounded, basal angles not prominent; striæ composed of large quadrate punctures; third, fifth and eight intervals more convex, each interval with a row of short, thick, inconspicuous bristles. Length 4 mm.

Posey County, Ind., rare; April 19. Berkeley Heights, N. J., July 6. Black Mountains, North Carolina, July 31. Described from Illinois. Ranges from New Jersey to Illinois, south to District of Columbia and N. Carolina. Occurs under decaying leaves. Feeds on a fungus growing on beech logs. (*Dury.*)

783 (——). ACALLES INFLATUS sp. nov.

Oval, very robust. Dark reddish-brown, rather thickly clothed with fuscous and grayish-yellow scales, the latter larger and condensed on sides of thorax, scattered over the basal third of elytra and forming a faint broad transverse band on their declivity; the fuscous scales condensed in two small dark discal spots on each elytron, one at basal fourth, the other slightly behind the middle; antennæ and tarsi paler reddish-brown. Beak as long as head and thorax, carinate, densely and finely punctate, scaly except near tip. Thorax about as wide as long, sides feebly rounded from base to beyond middle, then narrowed and slightly constricted to apex; disc densely, finely and deeply punctate, the median carina fine, slightly abbreviated near apex. Elytra broadly oval, strongly convex, widest at middle, one-third wider at base than thorax, humeri almost obsolete, sides broadly curved from base to apical fourth, then obliquely converging to apex; striæ deep, rather coarsely and distantly punctate; intervals convex, each with a row of very short, white, inclined setæ, these visible only in profile, more plainly on the declivity. Length 2.3—2.5 mm. (*W. S. B.*)

Putnam and Posey Counties, Ind., rare; March 20—Sept 30. Taken by sifting. Pineville, W. Va.; Leng collection. Specimens in the U. S. National Museum from Plummer's Island, Md., are labelled *A. pectoralis* Lec., but the single type of that species at Cambridge has the thorax sulcate as described by LeConte, not carinate as in *inflatus*, where the carina is plainly visible when viewed in profile. The beak is also much longer in the latter species.

784 (8765). ACALLES GRANOSUS Lec., 1876, 243.

Oval, rather robust. Black, densely clothed with dark brown scales; thorax marked with small spots of white pubescence and with a short, broken transverse white line at middle, its parts nearly joined by a short, posterior dorsal white line, thus forming a T-shaped mark; elytra with the brown scales mottled with dots of pale ones, of which the most conspicuous form a narrow, irregular, transverse band about the middle. Thorax as wide as long, rounded on sides, narrowed and broadly constricted in front; disc densely punctured, strongly carinate. Elytra ovate, wider at middle than thorax, truncate at base; strial punctures large, shallow, quadrate, each bearing a rounded scale; intervals well defined, the alternate ones slightly more elevated and interrupted so as to become tuberculate, their bristles very short but more distinct than in *carinatus*. Length 3.4 mm.

Lake Poinsett, Fla.; May 1. "Enterprise, Haulover and Indian River, Fla.; very rare." (*Schwarz.*)

785 (8767). Acalles sordidus Lec., 1876, 243.

Oval, convex, robust. Black, clothed with a dirt colored crust usually concealing the sculpture, and with intermixed slender, strongly recurved bristles. Beak naked and punctured toward the tip, not carinate. Thorax slightly wider at middle than long, strongly rounded on sides, obsoletely channeled near base, finely and densely punctate. Elytra strongly convex, not wider at base than thorax, distinctly wider at middle, where the width almost equals the length; striæ deep, serrately punctate; intervals distinctly convex, each with a row of strongly recurved bristles. Length 2—2.5 mm.

Recorded from Pennsylvania, Michigan, Ohio, District of Columbia and Texas. Described by Hamilton under the name *curtus*, he having found it in Pennsylvania under stones about beech trees in April; by beating in July. In the single specimen at hand the thorax is distinctly carinate in front of middle.

786 (——). Acalles porosus sp. nov.

Oval, robust. Uniform dark brown, thickly clothed with a dirty grayish brown crust of matted scales; antennæ and tarsi reddish-brown. Beak scarcely as long as thorax, strongly sulco-striate on basal half, finely and rather thickly reticulate-punctate toward apex. Thorax as wide as long, widest at middle, sides broadly rounded; disc widely, not deeply constricted near apex, coarsely not densely punctate. Elytra oval, strongly convex, not wider at base than middle of thorax, sides broadly rounded to apical third, then strongly converging to apex; striæ formed of large deep rounded punctures; intervals narrow, each with a row of short, nearly erect subclavate bristles. Length 2.8 mm. (*W. S. B.*)

Crawford County, Ind., rare; June 28. The uniform color, peculiar sculpture of beak and large punctures of elytra readily distinguish this from any described species.

787 (8766). Acalles subhispidus Lec., 1878, 431.

Blackish, densely clothed with dark brown scales, larger on the thorax than on elytra, where they are mixed with short, recurved bristles; thorax with a narrow lateral line and a few scattered scales of a pale dirt color; elytra with traces of two narrow undulated bands, composed of small spots of gray scales, one before the middle curving backwards and one behind the middle curving forward. Thorax wide, larger than in the other species, strongly rounded on sides in front, coarsely punctured. Elytra not wider than thorax, base truncate, basal angles obtuse, sides broadly rounded, then obliquely narrowed to apex; disc very little wider behind the base, striæ coarsely punctured. Length 3.7 mm.

Sumter County, Fla., May. One specimen in LeConte collection.

788 (8768). Acalles clavatus Say, 1831, 29; ibid, I, 297.

Oval, rather slender. Brown, thickly clothed with both dark and pale brown scales; elytra with two transverse rows of small white spots, one

before, the other just behind the middle. Beak rather stout, subdepressed, as long as head and thorax, finely and sparsely punctate, carinate above. Thorax slightly longer than wide, widest at middle, sides feebly rounded, disc very coarsely and sparsely punctured, its bristles a little shorter than those of elytra. Elytra at base not wider than middle of thorax, sides broadly rounded, narrowed from middle to apex; strial punctures large, quadrate; intervals narrow, slightly convex, each with a row of long, clavate bristles. Length 2.3—2.5 mm.

Posey County, Ind., rare; April 19. Lake Okeechobee, Fla., March 1. Enterprise and Jupiter, May—November on dead branches and under lake shore debris. Ranges from Illinois east and south to District of Columbia and Florida. Occurs beneath rubbish. As pointed out by LeConte, the female is much stouter, with thorax not wider at middle and elytra much more rounded on the sides.

789 (8769). ACALLES CRASSULUS Lec., 1876, 244.

Oval, rather robust. Black, densely clothed with dark brown scales; thorax with a few pale brown scales at sides and a small spot at middle of base; elytra brown toward the base and with an irregular broad yellowish-brown band behind, occupying the apical third; legs clothed with yellow-brown scales. Thorax as long as wide, rounded on the sides, slightly wider at middle, much narrowed and broadly constricted in front, densely punctured. Elytra as in *clavatus*, the bristles thick, erect, longer than those of thorax. Length 2.5 mm.

Enterprise, Haulover and other points in Florida; Oct. 19. (*Schwarz.*) Recorded elsewhere only from the District of Columbia.

790 (——). ACALLES SYLVOSUS sp. nov.

Elongate-oval, robust. Dark reddish-brown, densely clothed with blackish, pale brown and whitish scales, the brown ones forming some irregular markings on thorax and covering the greater part of elytra, the whitish ones arranged in small isolated spots which form two cross-bands on elytra. Beak finely and sparsely punctate, feebly carinate, scaly near base. Thorax as wide at middle as long, sides parallel near base, rounded at middle; disc broadly and feebly constricted near apex, sparsely and rather coarsely punctate. Elytra oblong-oval, not wider at base than middle of thorax; striæ with rows of rather small, deep, rounded punctures; intervals feebly convex, each with a row of rather short, inclined clavate setæ. Length 3.2 mm. (*W. S. B.*)

Little River, Fla.; March 31. Two specimens taken from beneath rubbish on bank of stream.

791 (——). ACALLES MINIMUS sp. nov.

Oval, rather slender. Black, thickly clothed with sooty and paler brown scales, the latter forming a narrow median line and some scattered dots

on thorax and a larger median basal blotch and some small widely scattered spots on elytra; antennæ, tibiæ and tarsi reddish-brown. Beak as in *sylvosus*. Thorax longer than wide, sides feebly rounded, disc not constricted in front, coarsely and rather sparsely punctate. Elytra regularly oval, sides broadly curved; striæ shallow, rather coarsely, not closely punctate; intervals as wide as the punctures, feebly convex, their setæ short, recurved, clavate. Length 2.1—2.3 mm. (*W. S. B.*)

Lake Okeechobee and Lemon City, Fla.; Feb. 28—March 22. Form of *claratus* but smaller, devoid of the white markings of that species and with much finer elytral punctures.

792 (8773). Acalles pectoralis Lec., 1876, 245.

Oval, robust. Black, covered with depressed dark brown and pale scales, the latter forming indistinct stripes on the thorax and narrow undulated bands on elytra, the intermixed bristles stout, short, erect; antennæ brownish-yellow. Beak and head scaly, the former coarsely punctured, finely carinate, its tip naked. Thorax wider than long, convex, much rounded on sides, constricted in front, channeled. Elytra oval, sides much rounded; striæ deep, fine; intervals wide, slightly convex. Body beneath deeply but not coarsely punctured, clothed with yellowish-brown scales. Length 3 mm.

The type and only known specimen was from Illinois and is in the LeConte collection. Recorded erroneously from District of Columbia. Readily known by the feebly emarginate mesosternum, flattened scales of upper surface and the thoracic groove, which is distinct but not broad and deep as in the next.

793 (8774). Acalles ventrosus Lec., 1878, 430.

Oval, very robust. Blackish, densely clothed with a crust of appressed dirty gray and fuscous scales intermixed with clavate bristles; the gray ones forming on elytra a broad band on basal third and some small scattered spots behind the middle; antennæ and tarsi reddish-brown. Beak very stout, shorter than thorax, flattened, finely carinate above, rather coarsely and densely punctate. Thorax uniform fuscous brown, nearly twice as wide as long, sides rounded, broadly and deeply constricted before apex; disc with a wide obtuse ridge the full length each side of middle, between the two a broad, deep groove. Elytra oval, strongly convex, base truncate, wider than thorax, sides broadly curved; striæ wide, deep; intervals convex, minutely punctulate. Under surface densely scaly, those of sides and last ventral dirty yellow. Length 4—4.5 mm.

Dunedin and Kissimmee, Fla., Jan. 18—Oct. 25; quite common beneath boards along the margin of ponds and lakes. "Enterprise and Tampa, two specimens." (*Schwarz.*) Specimens in the National Museum collection were taken at Kissimmee on Feb. 6 from the stomach of a meadow lark, *Sturnella magna* L.

XVI. Pseudoacalles gen. nov. (Gr., "false" + Acalles.)

As pointed out by both LeConte and Casey, *Acalles nuchalis* Lec. differs from other members of that genus too greatly in abdominal structure and other characters to allow its retention with them; it having the mesosternum feebly emarginate; episterna of the metasternum distinct and parallel; beak more slender and differently sculptured; second ventral twice as long as third, the latter equal to fourth; last joint of tarsi longer and claws larger. From *Canistes*, to which it is closely allied, it differs in its annulated antennal club and normal tibiæ. (*W. S. B.*)

794 (8772). Pseudoacalles nuchalis Lec., 1876, 244.

Oval, very robust. Blackish, clothed with dark and pale brown scales intermixed, the latter covering the head and forming three indistinct pale lines on thorax; elytra with an angulated transverse pale line near apical third, behind which the yellowish-brown scales are more numerous; under surface nearly black, with scattered pale scales. Beak strongly punctured, deeply striate near base, finely carinate. Thorax two-thirds wider than long, sides almost parallel from base to middle then rapidly narrowing to and feebly constricted near apex; disc coarsely and densely punctured, with a slight trace of a median smooth line. Elytra oval, sides much rounded, obliquely narrowed behind; disc with rows of large, quadrate punctures; intervals wide, convex, each with a row of rather long, pale, clavate bristles. Under surface nearly black, with scattered pale scales. Length 3.8—4 mm.

Dunedin, Fla., April 3; Biscayne Bay, July 27. Known also from Capron, Enterprise and Sand Point. In Leng collection from South Carolina.

XVII. Gerstæckeria Champ., 1905. (In honor of Gerstæcker.)

Large, robust species, possessing the characters given in generic key, and having the beak at least as long as thorax, the antennæ inserted near its middle with their grooves directed at lower corner of eyes; elytra without humeri; femora unarmed. All the species feed upon cacti. About 22 species have been described from Central America, Mexico and the United States, only three of which are known from our territory. The latest paper on them is by

Pierce, W. D.—"The Cactus Weevils" *in* Proc. U. S. Nat. Mus., Vol. 42, 1912, 159—167.

KEY TO EASTERN SPECIES OF GERSTÆCKERIA.

a. Elytra with a crest or tubercle behind the humeri; eyes well separated; antennæ inserted at middle of beak.

b. Elytral foveæ isolated and rounded. 795. HUBBARDI.

bb. Elytral foveæ contiguous, coalescent. 796. DILATATA.

aa. Elytra without posthumeral crest or tubercle; eyes narrowly separated; third tarsal joint wider than second; thorax large, about as wide as elytra; claws small and approximate. 797. FASCIATA.

Fig. 111. *Gerstæckeria nobilis* Lec., dorsal and side views × 5. (After Hunter & Pratt.)

795 (8757). GERSTÆCKERIA HUBBARDI Lec., 1880, 216.

Subpyriform, very robust. Black, clothed with appressed brown and whitish scales, the latter covering the head and, in great part, the legs, and forming a few small dots on thorax, a short oblique posthumeral band, a narrow, undulatory postmedian one and some small spots on the declivity of elytra. Beak as long as thorax, cylindrical, curved, shining, punctate. Head with a deep median fovea. Thorax slightly wider than long, sides strongly rounded, distinctly constricted near apex; disc convex, coarsely and densely punctured, carinate at middle. Elytra strongly and obliquely dilated and with an obtuse rounded angle behind the humeri; striæ deep, with large impressed foveæ; intervals very convex. Length 6.5—8.2 mm.

Dunedin, Enterprise, Crescent City and Lake Worth, Fla. Selma, Alabama, April 7—Oct. 1. Occurs on and beneath the leaves of a prickly-pear cactus, *Opuntia vulgaris* Mill.

796 (——). GERSTÆCKERIA DILATATA Casey, 1895, 834.

Form of *hubbardi* but more robust. Color nearly the same, the thorax with velvety black scales on apical half and each of the large foveæ of elytra with a broad whitish scale. Frontal fovea deeper and less elongate. Elytra much more abruptly dilated behind the base, the post-humeral ridges or tubercles larger; disc with deep rows of very large contiguous foveæ; intervals narrow, strongly convex, each with numerous small tubercles on the crest. Length 8 mm.

Described from Florida. "The elytral foveæ are so closely crowded that they coalesce, producing deep, broad furrows between the ridge-like intervals." (*Casey.*) Pierce considers *dilatata* merely a sculptural variety of *hubbardi*.

797 (——). GERSTÆCKERIA FASCIATA Pierce, 1912, 166.

Oval, robust. Black, clothed with white, golden and brown scales; head with golden or cream colored ones; thorax golden with a few white dots; elytra with prominent spots of white scales behind the humeri on fourth and seventh intervals, and with golden scales condensed to form a spot at the base of third interval, another on the suture behind the middle, and a transverse postmedian cross-bar bordered with brown scales; antennæ reddish-brown; abdomen clothed with golden scales. Beak shining, very finely punctate. Front strongly foveate. Thorax large, sides strongly curved, disc shallowly punctate with smooth spots on sides. Elytra inflated at basal third, then tapering to apex; less than one-half wider than thorax; strial punctures large, shallow; intervals as wide as punctures. Tarsal claws small, approximate. Length 5.5 mm.

Buck Key, Fla., one specimen. Cat. No. 14,473, U. S. Nat. Mus.

XVIII. APTEROMECHUS Faust, 1896.
(Gr., "without wings" + "long.")

Small oblong, rather slender species having the second joint of funicle much shorter than first, 3—7 equal, gradually a little wider; eyes large, narrowly separated; front margin of thorax not completely concealing the head, the postocular lobes feeble; elytra with rounded humeri, their tenth stria interrupted by the hind coxæ; third and fourth ventral segments subequal in length; femora unarmed, the hind pair sulcate beneath.

798 (8800). APTEROMECHUS FERRATUS Say, 1831, 28; ibid, I, 296.

Oblong-oval. Blackish, densely clothed with dark and pale brown scales; alternate elytral intervals more convex, ornamented with small pale dots, the scales intermixed with very short bristles. Beak stout, shorter than thorax, finely and sparsely punctate. Thorax one-fourth wider than long, narrowed in front, sides rounded, base strongly bisinuate; disc coarsely and densely punctate. Elytra oblong, wider at base than thorax, sides subparallel to behind middle, then obliquely rounded to apex; striæ deeply and rather coarsely punctate. Length 3—3.5 mm.

Lake, Floyd, Crawford and Posey counties, Ind., scarce; April 13—June 9; taken from beneath the bark of beech. Dunedin and Enterprise, Fla., common in hammocks, Feb. 28—May 29. Near New York City, May—Sept., on oak, chestnut and various other trees. Ranges from New York to Michigan, south to Florida,

where it is common infesting the branches of the red bay, *Persea borbonia* L., and is never met on oak. (*Schwarz.*)

XIX. Cryptorhynchus Ill., 1807. (Gr., "hidden" + "beak.")

Oval or oblong, rather robust, usually densely scaly species, having the eyes rather widely separated; antennæ inserted at middle of beak; ocular lobes covering but partially the eyes in repose; elytra with ten entire striæ; mesosternal process with a deep rounded cavity; metasternum with distinct side pieces; ventral segments 2, 3 and 4 subequal in length, the second sometimes one-fourth longer than either of the others, but not twice as as long as in some of the allied genera; femora thickened, often bidentate; tibiæ slender, usually more or less sinuate. The larvæ are bark borers and the adults are usually found on bark or dead twigs.

KEY TO GROUPS* OF EASTERN SPECIES OF CRYPTORHYNCHUS.

a. Joints 3—7 of funicle gradually diminishing in length, the second joint as long as or longer than the first; club usually indistinctly annulated.
  b. Elytra suddenly much wider at base than thorax, the latter usually distinctly carinate. Group I.
  bb. Elytra but slightly wider at base than thorax. Group II.
aa. Joints 3—7 of funicle equal in length, second joint slightly shorter than first; club very distinctly annulated. Group III.

Group I. (parochus group.)

Species of small or medium size, resembling *Conotrachelus* in having the elytra suddenly wider than thorax, the humeral angles prominent, rounded, the sides gradually somewhat tapering behind; beak slender, longer than thorax, curved, cylindrical, usually carinate and striate near base; legs slender, femora not clavate, indistinctly toothed.

KEY TO SPECIES OF GROUP I.

a. Front and middle femora straight beneath.
  b. Tibiæ angulated at base.
    c. Black with a more or less oblique white spot on each elytron; thighs bidentate.
      d. Larger, 5 or more mm.; form more oval. 799. parochus.
      dd. Smaller, not over 4.5 mm.; form oblong. 800. pumilus.
    cc. Brown variegated with fuscous; thighs not toothed. 801. bisignatus.

*Those of our groups which occur in Central America have received generic names, which, however, we have only partly indicated in the descriptions. According to Faust the imported *C. lapathi* may be our only true *Cryptorhynchus.*

bb. Tibiæ not angulated at base; fuscous, elytra largely pale brown; thorax and elytra with tufts of black bristles. 802. FUSCATUS.

aa. Femora sinuate near the tip.

e. Femora armed with two small denticles; length 7—11 mm.

f. Elytra black or fuscous, the apical third densely covered with white or yellowish scales. 803. LAPATHI.

ff. Elytra dusky, with two paler transverse bands; thorax rounded on sides, strongly narrowed in front, feebly constricted. 804. OBLIQUUS.

ee. Femora armed with a single acute tooth.

g. Pale yellow-brown; thorax with an abbreviated median carina; larger, 7.8 mm. 805. HELVUS.

gg. Black, clothed with depressed, dirt-colored scales; thorax not carinate; smaller, 5.7—6 mm. 806. LUTOSUS.

799 (8786). CRYPTORHYNCHUS PAROCHUS Herbst, 1797, 55.

Oval, robust. Black, above densely clothed with small brown and black scales; elytra each with an oblique white spot before the middle; antennæ and tarsi dark reddish-brown. Thorax at base one-third wider than long, gradually narrowed from the base forward, strongly constricted near tip; surface very uneven, strongly carinate; punctures concealed by the scales. Elytra more than one-third wider at base than thorax, disc finely striate, the strial punctures small; alternate intervals strongly carinate. Under surface thickly clothed with large, dirty white scales. Length 5—6.5 mm.

Putnam, Brown and Posey counties, Ind., scarce; April 25—Dec. 25. Beaten from elm. Kissimmee River, Fla., Feb. 21. Ranges from Canada and New England to Michigan and Iowa, south to District of Columbia and Florida. Lives under the bark of butternut. The two teeth of femora are small and well separated. The wide, flat intervals of elytra are dark brown, the elevated ones mottled with black spots. The oblique white spot varies much in size, being often faintly indicated. The larvæ mine the inner bark and sap-wood of weakened and decayed walnut. (*Hopkins.*)

800 (8788). CRYPTORHYNCHUS PUMILUS Boh., Schön., 1837, 122.

Oblong, rather slender. Color of *parochus*. Thorax wider near base, less narrowed and more feebly constricted near tip, its median carina feeble. Elytra less than one-third wider at base than thorax, humeri less prominent; sides nearly parallel from base to middle, then gradually converging to apex; alternate intervals less elevated, their crests more obtuse. Length 4—4.5 mm.

Lake and Posey counties, Ind., rare; May 12—13. West Point, N. Y. Jamesburg, N. J., July 4. Ranges from Ontario and New Jersey to Indiana and Florida. The white spot of elytra is distinct and the elevated intervals velvety-black from base to

beyond middle. Champion regards this as a synonym of *bisignatus* but it is readily separated by the characters given.

801 (8787). CRYPTORHYNCHUS BISIGNATUS Say, 1831, 19; ibid, I, 284.

Similar in form and color to *parochus*, differing chiefly in its much smaller size. Elytra less mottled with black. Thoracic carina and alternate intervals of elytra less elevated. Femora either entirely unarmed or very feebly bidenticulate. Length 2.5—3.5 mm.

Lake, Starke, Putnam, Brown and Lawrence counties, Ind., frequent; probably throughout the State; Apr. 30—June 16. Beaten from oak and birch. Throughout New Jersey, May—July, on chestnut, beech and birch, probably living under the bark. Dunedin, Sanford and Sarasota, Fla., Feb. 28—March 30. Ranges from Canada and New England to Michigan and Iowa, south to Florida and Texas. Recorded as occurring on the leaves of oak in May (*Packard*); mating on a chestnut log in June (*Chittenden*); on a living trunk of birch infested with Scolytids. (*Beutenmüller.*)

Specimens from Dunedin, Fla., differ in having the form more slender, scales of upper surface largely clay-yellow and fuscous, the paler ones forming numerous narrow, zigzag lines across the elytra, in addition to the usual oblique pale spot which is abbreviated. Length 3.2—3.5 mm. They may be known as var. *tessellatus.* (*W. S. B.*)

C. obliquefasciatus Boh., described from North Carolina, recorded from Ontario, and represented by occasional specimens in many collections, is a mere color variety in which the oblique white spot of elytra extends from the seventh to the second stria, becoming a band, and the scattered white dots are more conspicuous. Length 2.5 mm.

802 (8789). CRYPTORHYNCHUS FUSCATUS Lec., 1876, 251.

Oblong-oval, robust. Blackish-brown, densely clothed with pale and dark brown scales and bunches of erect blackish bristles, the pale scales forming some scattered spots on thorax and a broad median band covering more than half of the elytra, obliquely limited in front and vaguely enclosing a darker patch about middle of suture; the pale scales sometimes forming an indefinite oblique anterior fascia and a short transverse fascia at apical third; the bristles arranged in five tufts on disc of thorax and three or more along the third and fifth intervals of elytra. Beak stout, as long as thorax, carinate, striate, coarsely punctured near base. Thorax as wide as long, sides broadly rounded, feebly narrowed and constricted on apical third; disc coarsely, deeply and densely punctate. Elytra one-third wider at base than thorax, sides parallel to beyond the middle, striæ fine, punctured; alternate intervals, except the ninth, more elevated. Femora slender, not or indistinctly toothed. Length 4—6 mm.

Whitley, Knox, Crawford and Posey counties, Ind., scarce; April 26—Aug. 5; beaten from hickory. Numerous localities in

New Jersey, May 20—December; by sifting old leaves in a swamp on the latter date. Dunedin, Fla., March 17. Ranges from New Jersey to Michigan, south to Florida and Mississippi. Occurs on dead twigs. (*Ulke.*) The beak is stouter and the postocular lobes more prominent than in the other species of the group.

803 (11,073). CRYPTORHYNCHUS LAPATHI Linn., 1746, No. 591.

Elongate-oval, robust. Black or piceous, not shining, densely clothed with sooty black and pale scales, intermixed with tufts of erect black bristles; the pale scales covering the apical third of elytra and forming an obscure oblique band on basal third of each; thorax, legs and body beneath mottled with similar scales; antennæ and tarsi reddish-brown. Beak as long as head and thorax, coarsely and densely punctate, feebly carinate. Thorax one-third wider than long, disc densely, closely punctured, with a low, nearly entire median carina. Elytra at base one-third wider than thorax; sides parallel for two-thirds their length, then converging to an obtuse apex; strial punctures large, quadrate. Length 7.5—10 mm. (Fig. 112.)

Fig. 112. × 5. (After Forbes.)

Not yet known from Indiana, though it undoubtedly occurs in the northern counties. Found throughout northern New Jersey on willow, May—September. Batavia and Ithaca, N. Y., June 15—Oct. 3. Chicago, Ill., July 30. A European species, first noted in this country in New York in 1882, now distributed from Orono, Maine, to Wisconsin and North Dakota, south to District of Columbia. Attacks the weeping willow, Carolina poplar, red birch and other similar ornamental trees and called the "poplar and willow borer" by Forbes. The adults puncture the bark, gouging out the cambium layer, while the young, which hatch in the older bark of the branches, mainly in August and September, penetrate at once the cambium layer in which they hibernate, pupating in the older wood and emerging the following May or June. In trees where the grubs are few they may be cut out and the wounds covered with tar. Badly infested trees should be removed and burned in winter or spring. Arsenical sprays can also be used to advantage. Webster (1911) states that adults were kept five days in a freshly and heavily charged cyanide bottle and were then found alive and mating.

804 (8790). Cryptorhynchus obliquus Say, 1831, 28; ibid, I, 296.

Oval. Black, densely clothed with dusky, black and white rounded scales; thorax with three black spots; elytra each with two black spots in front of a common whitish oblique band on basal third and with a similar band behind the middle; antennæ and tarsi reddish-brown. Beak about as long as thorax, coarsely and rather densely punctate and carinate on basal half, somewhat flattened, smooth and shining towards tip. Thorax scarcely wider at base than long, strongly narrowed in front, sides moderately rounded; disc densely and rather finely punctate, the median carina abbreviated in front. Elytra one-third wider at base than thorax, humeri and apex obtusely rounded; alternate intervals moderately elevated, subconvex, the others flat. Ventral segments coarsely and sparsely punctured, the fifth with a deep circular impression in male. Denticles of the femora small, close together. Length 7—9 mm.

Hudson County and Lakehurst, N. J., May 30. Great Falls, Va.; June 16. Recorded only from the Middle States, (*LeConte*); Louisiana, (*Say.*) Crescent City, Fla. (*Schwarz.*)

805 (8791). Cryptorhynchus helvus Lec., 1878, 431.

"Very similar to *C. obliquus* and differing only in the following characters: Scales pale yellow-brown, slightly variegated with darker; form of body a little narrower. Thorax a little longer than wide, sides obliquely narrowed from the middle, where they are rounded to apex, nearly parallel behind the middle. Elytra with the intervals wide and flat. Thighs with one small, acute tooth. Length 7.8 mm. Except for the difference in the form of thorax I would consider this as merely a variety of *obliquus*." (*LeConte.*)

Enterprise, Fla., May; very rare on dead vines. (*Schwarz.*) The type and only known specimen is in the Cambridge collection.

806 (8793). Cryptorhynchus lutosus Lec., 1884, 31.

Elongate-oblong. Black, densely clothed with dark brown scales and a few short, stout bristles intermixed; elytra with scattered paler brown scales at base and forming a transverse band near apical third. Beak slender, naked, as long as thorax, finely and sparsely punctate and with a deep punctured groove each side; front with a small deep fovea. Thorax as wide at middle as long, not carinate, sides parallel behind the middle, then obliquely rounded to apex, behind which there is a broad shallow constriction; disc prolonged above, densely, finely and deeply punctate. Elytra one-third wider than thorax at base, humeri obtusely rounded, sides parallel to apical third, then converging to the rounded apex; striæ composed of large distant punctures; intervals flat. Length 5.7—6 mm.

New River, Fla., March 7. Miami, March 10. Known also from Cape Jupiter, Biscayne Bay and Lake Worth, Fla., breeding abundantly in the flower disks of the leguminous shrub, *Ecastophyllum brownei.* (*Hamilton.*)

GROUP II. (OBTENTUS GROUP.)

Oblong or elongate-oval species having the beak as long as thorax, rather stout, usually somewhat flattened near tip, antennæ inserted near its middle; thorax as wide or wider than long, sides rounded, disc usually distinctly carinate; elytra at base but little wider than thorax, humeral angles obtusely rounded, not prominent, sides parallel to middle or beyond, then obliquely narrowed to tips.

KEY TO SPECIES OF GROUP II.

a. Thorax distinctly constricted near apex; femora usually with a single, often nearly obsolete tooth.
b. Alternate intervals of elytra without stiff erect spines.
c. Larger, 4 or more mm.; thorax distinctly carinate; elytra without a pale transverse band.
d. Thorax with an elongate median spot of white scales. 807. OBTENTUS.
dd. Thorax with sides broadly pale, the disc black. 808. FALLAX.
cc. Smaller, less than 3 mm.; thorax not carinate; elytra with a pale transverse band. 809. MINUTISSIMUS.
bb. Alternate elytral intervals with short, stiff, erect setæ or spines; length 3—3.7 mm. 810. APICULATUS.
aa. Thorax feebly or not at all constricted near tip.
e. Form elongate-subcylindrical; thoracic carina almost imperceptible; elytra black with white mottlings.
f. Beak stout, shorter than thorax, strongly punctate; femora with a small blunt tooth; smaller, 3.2—3.7 mm. 811. LONGUS.
ff. Beak rather slender, as long as thorax, almost smooth; femora unarmed; larger, 4.2—4.5 mm. 812. SCHWARZI.
ee. Form elongate-oval; thoracic carina distinct; elytra densely clothed with grayish-brown scales, with tufts of darker bristles on alternate intervals; femora with two distinct teeth. 813. TRISTIS.

807 (8794). CRYPTORHYNCHUS OBTENTUS Herbst, 1797, 38.

Elongate-oval. Sooty-black, densely clothed with small, depressed scales, with very short bristles intermixed; thorax with an elongate median spot of large whitish scales, wider at middle and including a dark central spot, its front part often in part abraded, leaving it of a Y-shape; elytra with a large spot of yellowish scales crossing the suture just behind the middle; scutellum white or yellow. Beak coarsely and rather densely punctate, obsoletely carinate. Thorax one-third wider than long, sides nearly parallel from base to beyond middle, then strongly rounded to apex. Third and fifth intervals of elytra strongly elevated. Length 4.7—6.8 mm.

Lake, Vermillion and Crawford counties, Ind., scarce; May 29—Sept. 5. Riverside and Willow Springs, Ill.; June 13—July 11. Hopatcong, Ft. Lee and Orange Mts., N. J.; June. Enter-

prise, Fla., Nov 17. Ranges from New York to Illinois, south to Florida and Louisiana. Occurs on dead twigs.

808 (8795). CRYPTORHYNCHUS FALLAX Lec., 1876, 253.

Elongate-oval. Black, densely clothed with pale brownish-yellow scales, with intermixed short bristles; disc of thorax and large common basal triangular spot on elytra black; antennæ and tarsi reddish-brown. Beak subdepressed, finely and rather closely punctate, feebly carinate. Thorax one-third wider than long, strongly narrowed and constricted in front; disc very finely carinate on basal half, deeply and densely punctured. Elytra very little wider than thorax at base, striæ composed of large, subquadrate punctures, intervals feebly convex, the third and fifth more elevated. Femoral tooth very small; tibiæ straight, outer edge angulated near base. Length 3.2—5 mm.

Kosciusko, Fulton, Marion and Posey counties, Ind., scarce; Apr. 18—June 19. Taken by sifting and beneath beech logs. Not rare throughout New Jersey, May—Sept. Enterprise, Fla., Oct. 19. Ranges from Ontario and New York to Michigan, south to North Carolina, Florida and Texas. Bred in September from hickory limbs, dead two years. (*Hamilton.*) Breeds in the stems of *Cassia*. (*Pierce.*)

809 (8796). CRYPTORHYNCHUS MINUTISSIMUS Lec., 1876, 254.

Short, oval. Brown, varied with blackish spots, clothed with black, brown and pale scales, intermixed with short, stout, erect bristles; the pale scales forming an elongate basal spot on the thorax and a transverse band just behind a large lunate black spot on the middle of elytra. Beak stout, finely, sparsely punctured, naked beyond the middle. Thorax scarcely wider than long, gradually narrowed in front, disc not carinate, ocular lobes obsolete. Scutellum very small. Elytra oval, very little wider at base than thorax, striæ composed of large punctures, which are hidden by the scales. Femora unarmed; tibiæ as in *fallax*. Length 2.2—2.5 mm.

Hudson Co. and Atco, N. J.; Anglesea, on dead oak twigs, May 30. Clayton, Ga., June. Dunedin and Enterprise, Fla., March 4—Dec. 17. Beaten from dead branches of the bayberry, *Myrica cerifera* L. Ranges from Pennsylvania and New Jersey to Ohio, south to Georgia, Florida and Louisiana.

810 (8797). CRYPTORHYNCHUS APICULATUS Gyll., Schön., 1837, 121.

Oblong-oval. Black, densely clothed with grayish-white and fuscous scales; the paler ones forming a narrow median line on thorax and covering in large part the basal half of elytra; beak, antennæ and tarsi reddish-brown. Beak as long as thorax, smooth, shining, carinate at base. Thorax one-fourth wider than long, sides strongly rounded, disc suddenly and strongly constricted near tip, finely and densely punctate. Elytra oblong, sides parallel for two-thirds their length, then broadly rounded to apex;

strial punctures hidden by scales; alternate intervals feebly elevated. Length 3—3.7 mm.

Dunedin, Fla., rare; Jan. 20—Oct. 31. Enterprise, Oct.; New River, March 7. Described from Florida. Very distinct by the erect, stout bristles or spines which are sparsely placed upon the thorax, and upon the alternate intervals of elytra; also by the thorax being so suddenly constricted in front.

811 (8782). CRYPTORHYNCHUS LONGUS Lec., 1876, 248.

Elongate, subcylindrical. Black, densely clothed with small black scales which make the surface opaque; elytra mottled irregularly with small dots of white scales; antennæ and tarsi reddish-brown. Thorax longer than wide, widest at middle where the sides are strongly rounded, much narrowed in front, feebly narrowed behind, feebly constricted near the tip, which is broadly rounded, coarsely and confluently punctured. Elytra scarcely wider than thorax, subcylindrical, base truncate, humeri rounded; striæ deep, composed of large approximate punctures; intervals narrow, the outer ones convex. Beneath coarsely punctured, somewhat shining. Femora obsoletely toothed. Length 3.2—3.7 mm.

Little River, Fla.; March 17. Haulover and Enterprise, rare. Known also from Cuba. Originally described as a *Tylodema*, but the funicle is 7-jointed and the ocular lobes very feeble.

812 (——). CRYPTORHYNCHUS SCHWARZI sp. nov.

Elongate-subcylindrical. Blackish-brown, elytra with scattered patches of silvery-gray scales which, at apical third, are condensed to form a broad irregular cross-bar; antennæ and tarsi reddish-brown. Beak as described in key, minutely and sparsely punctate. Head naked, finely and densely punctate. Thorax as wide at middle as long, narrower at base and toward apex, disc not constricted, densely and rather finely punctate, each puncture bearing a minute brown scale, the intervals between the punctures forming fine oblique ridges. Elytra but slightly wider at base than middle of thorax, humeri distinct, rounded; sides parallel for three-fourths their length, then feebly converging to the rounded apex; striæ with rows of coarse, oblong, rather distant punctures; intervals feebly convex, not setose. Under surface coarsely, rather sparsely punctate. Front femora strongly angulated beneath near apex. Length 4.2—4.5 mm. (*W. S. B.*)

Lake Okeechobee, Fla.; March 7; rare. Two similar specimens from Biscayne Bay, Fla., are in the Horn collection at Philadelphia bearing the label *C. tylodermoides*, a manuscript name of Dr. E. A. Schwarz, to whom we take pleasure in dedicating the species.

813 (8798). CRYPTORHYNCHUS TRISTIS Lec., 1876, 255.

Elongate-oval, densely clothed with dark gray or fuscous scales, with intermixed short erect bristles which, on the elytra, are arranged in tufts

upon the alternate intervals. Beak slightly longer than thorax, more slender at tip, finely and rather densely punctured. Thorax scarcely wider than long, narrowed in front of base, sides moderately rounded; disc densely and deeply punctured, strongly carinate. Elytra oval, their base as wide as thorax at middle, humeri rounded, sides very feebly curved from base to tips; alternate intervals feebly convex, bearing tufts of erect bristles. Length 4—5 mm.

Lake and Posey counties, Ind., rare; April 19—May 20. Various points in New Jersey, April to September. Ranges from New York to Iowa and Kansas, south to District of Columbia. Schwarz (1890, 233) states that it feeds on the leaves of the scarlet oak, *Q. coccinea* Wang. but is nocturnal, hiding during the day in the ground at the base of the tree, and developing under the bark.

GROUP III. (OBLONGUS GROUP.)

This group contains only a single oblong species of medium size, having the antennal characters as mentioned in key; thorax slightly wider than long, rounded on the sides, narrowed in front, not strongly constricted, disc not carinate, postocular lobes feeble; elytra wider at base than thorax, humeri rounded, not prominent, sides parallel then obliquely rounded to tip; femora obtusely toothed, the front pair with an additional denticle.

814 (8799). CRYPTORHYNCHUS OBLONGUS Lec., 1876, 256.

Elongate-oblong. Black, thickly clothed with brown and gray scales, irregularly intermixed and without accompaning bristles; back of head and three indistinct lines on thorax pale; elytra with some small, scattered blackish spots and an elongate narrow one on fifth interval behind the middle. Beak dark brown, naked, as long as thorax, more slender than usual, nearly straight, finely and rather closely punctate, feebly carinate. Thorax deeply and densely punctured. Elytra one-fourth wider than thorax, strial punctures small, close-set; intervals convex, equal. Under surface coarsely and densely punctured, thinly clothed with large pale scales. Length 6—6.5 mm.

Dunellen, N. J., rare. Dunedin, Enterprise and Biscayne, Fla., rare; March 31. Ranges from New Jersey southwestward to Florida and Texas.

Subfamily XI. THECESTERNINÆ.

THE BISON SNOUT BEETLES.

Medium sized, roughly sculptured, snout beetles, having the antennæ feebly elbowed, their clubs ringed or annulated; prosternum excavated beneath; elytra with a strong fold near the outer

margin of the under surface; pygidium of male transversely divided; tarsal joints set with small bristles beneath.

In addition to the characters mentioned, the Thecesterninæ have the mandibles short, stout, pincer-shaped and without an apical scar; antennæ short, inserted in front of the eyes, funicle 7-jointed, its last joint wider and forming part of the club, which is oval and pointed; head strongly deflexed; eyes transverse and in repose partly hidden by the short ocular lobes of thorax; beak short, stout, strongly constricted at insertion of antennæ; thorax rounded in front and projecting partially over the head, deeply excavated beneath for the reception of the head and beak; elytra connate, rigid, covering the pygidium; abdomen with first and second ventral segments long, closely united at middle, third and fourth short, the two together only as long as fifth; front coxæ small, contiguous, rounded, middle ones separated, hind ones more widely separated and distant from the sides of the elytra; legs slender, tibiæ truncate at tips and armed with two small spurs; tarsi 4-jointed, narrow, third joint in our species not dilated or bilobed; claws simple, slender, free.

The Byrsopidæ of Lacordaire, according to Sharp (Biol. Cent. Am. Col., IV, p. 3, p. 86), must be wholly dissolved, as being composed of forms having little relation one with another. Moreover, *Thecesternus* 1831, has three years' precedence over *Byrsops* 1834. Sharp states that the true position of *Thecesternus* is unknown, but may be with the Cryptorhynchini which have the same excavated breast. LeConte (1876, 12) placed it as a tribe "distinguished from other Byrsopidæ by the peculiar conformation of the prosternum which forms a triangular plate in front of the coxæ." In our own view, while the feebly elbowed antennæ with comparatively non-compact club indicate primitive character, the excavated breast, roughly sculptured surface, narrow tarsi with third joint not dilated, and general facies, make a position between Cryptorhynchini and Cossoninæ most appropriate and most easily found by the student. The subfamily is represented in North America by the single genus:

I. Thecesternus Say, 1831. (Gr., "box" + "breast.")

This genus, so named on account of the deep excavation in the prosternum for the reception of the beak, is distinguished by the presence of a triangular plate in front of the fore coxæ, this

plate being a modification of the prosternum. (Fig. 113.) The genus is represented in the United States, according to Pierce, by eight or more nominal species, though but one is recognized in the Henshaw Catalogue. Of these LeConte (1856, 18) described six, which were based largely upon the development or prolongation of the humeral angles of the elytra. Twenty years later (1876, 12), with more abundant material, he combined these with Say's original *humeralis*, stating that "there are all gradations, from typical *humeralis* in which the humeral processes are fully one-third as long as thorax, to *T. morbillosus* Lec., in which the elytra are truncate at base and the humeral angles only slightly prolonged." Pierce (1909, 334) has described four additional forms from Texas and New Mexico.

815 (8229). THECESTERNUS HUMERALIS Say, 1826, 254; ibid, II, 316.

Fig. 113. A, Beetle × 4; B, front view of head and fore coxæ showing *a*, plate in front of fore coxæ, *b*, beak and mandibles, *c*, coxæ. (Original.)

Elongate-oblong, robust. Dull black, usually densely covered with a crust of minute brownish-yellow scales. Beak shorter than head, almost hidden in repose; front deeply sulcate. Thorax as wide as long, widest at middle, narrowed in front; disc marked with very coarse irregular, seta-bearing punctures and with four large shallow impressions. Elytra slightly wider at base than thorax, somewhat pointed behind, humeral angles strongly produced forward along the sides of base of thorax; disc with rows of large irregular foveæ; intervals alternately more elevated and bearing rows of very short white bristles. Ventral segments coarsely and sparsely punctured. Length 6.5—9 mm. (Fig. 113.)

Crawford and Posey counties, Ind., scarce; May 7—June 26. Taken from beneath stones and dried cow dung on high rocky slopes. Palos Park, Ill., Sept. 20. Originally found under dried buffalo dung in the Western States. Riley states that it sometimes "cuts off the blossoms of grape vines in May." Ranges from Indiana and Tennessee to Colorado, Kansas and Texas. According to Pierce's table, loc. cit., our eastern form may be considered as var. *affinis* Lec., having the humeral angles only slightly produced forward and covering the basal angles of thorax; elytra less than two and a half times as long as thorax, their sides convex.

Subfamily XII. COSSONINÆ.

THE BROAD-NOSED BARK BEETLES.

This subfamily, as here treated, is equivalent to the Cossoninæ of LeConte with the Acamptini added. Its strongest characters are in the normal mouth parts and modified antennæ which depart from the form seen in Curculioninæ either by reduction in number of funicular joints or by enlargement and loss of pubescence in first joint of club. A prolongation of the inner apical angle of the tibiæ into a long curved spine or hook is also usual, and the tarsi are usually narrow with feebly emarginate or simple third joint. These characters are to a great extent duplicated in the subtribe Hydronomi (p. 221), especially in *Lissorhoptrus* and *Bagous;* the student must therefore exercise care in comparing the descriptions.

The members of the subfamily are small oblong or elongate black or brown species having the eyes small, sometimes wanting; beak variable in length, often very short and broad; antennæ variable, both in insertion and structure, the scape generally reaching to or beyond the eyes; club small, oval, feebly annulated; elytra long, conjointly rounded at tip, concealing the pygidium; first and second ventral segments each much longer than third and fourth united; femora unarmed. The species live mostly beneath bark of dead trees, though certain genera occur only along the coast, living in old boards, roots, etc., washed upon the beach. In addition to the papers of Horn and LeConte mentioned under Calandrinæ, our species are treated in part by

Casey, Thos. L.—"Coleop Notices, IV,—Cossoninæ," *in* Ann. N. Y. Acad. Sci., VI, 1892, 689—707.

Van Dyke, Edwin C.—"The Species of *Cossonus* Clairv. of America North of Mexico," *in* Bull. Brook. Ent. Soc., X, 1915, 1—23.

Canistes schusteri Casey, of the tribe Cryptorhynchini, has many characters suggestive of this subfamily. LeConte (1876, 329) regarded the Cossoninæ as a connecting line from Hylobiini to Scolytidæ, to which family the tribe Rhyncolini are closely related, both in appearance and habits.

KEY TO TRIBES OF SUBFAMILY COSSONINAE.

a. Body uneven, covered with a crust.

b. Beak short, stout, resting in repose upon the front coxæ; surface with stout erect bristles. Tribe I. ACAMPTINI, p. 519.

bb. Beak long, not dilated at tip; surface without erect bristles.

c. Funicle 7- or 8-jointed. Tribe II. ANCHONINI, p. 520.

cc. Funicle 4- or 5-jointed. Tribe III. DRYOPHTHORINI, p. 523.

aa. Body not covered with a crust, usually glabrous and shining.

d. Front coxæ separated by more than one-half their width; beak as long as or longer than head, usually dilated at the end, its grooves rapidly descending; funicle 7-jointed; body sometimes depressed. Tribe IV. COSSONINI, p. 525.

dd. Front coxæ very narrowly separated; beak usually shorter than head, continuous with the front and equally stout; funicle 5- to 7-jointed; body subcylindrical. Tribe V. RHYNCOLINI, p. 537.

Tribe I. ACAMPTINI.

Species of elongate, subcylindrical form having the base of the short beak received in a groove, the tip resting upon the front coxæ, which are contiguous, prominent, and in part excavated for its reception; club of antennæ pubescent and sensitive only near the tip; prosternum deeply and broadly emarginate in front; second ventral segment longer than third and fourth united; tibiæ stout, sinuate on the inner side, strongly hooked at tip; tarsi not dilated nor spongy beneath. One genus, treated as a group of Cryptorhynchini by LeConte but associated with Cossoninæ in Biologia, is known.

I. ACAMPTUS Lec., 1876. (Gr., "without flexibility.")

Distinct and aberrant species with narrow elongate body, clothed with a dirt-colored crust and bristling with thick, erect, clavate setæ; beak stout, somewhat flattened above, as long as head and not separated from the latter by groove or constriction; eyes small, very widely separated, in great part hidden in repose; funicle 7-jointed, the first joint longer, the others short, closely united, gradually increasing in width (Fig. 13, *f*); femora not toothed, tarsi slender, cylindrical, the third joint not bilobed; claws slender, free and divergent.

816 (8753). ACAMPTUS RIGIDUS Lec., 1876, 239.

Elongate, subcylindrical. Dark reddish-brown, thickly covered with dirty brown hair and short, erect, stout bristles, which conceal the sculpture. Thorax projecting over the head, one-fourth longer than wide, sides very feebly rounded, disc broadly constricted at apical third; apex rounded, base feebly bisinuate, dorsal channel faint. Elytra at base about one-fourth wider than thorax, subcylindrical, rounded behind, strial punctures large, quadrate; third, fifth and seventh intervals wider, much more prominent and bearing rows of bristles. Beneath very coarsely punctured and with scattered, short, coarse hairs. Length 3—4 mm.

Vigo Co., Ind., rare; May 20. Riverside and Edgebrook, Ill., June 13—Aug. 12. Dunedin, Fla., April 4. Ranges from Ontario,

Canada, Michigan and Ohio south to District of Columbia, Florida and Texas. Occurs in red-rotten wood. (*Ulke.*)

The type of *A. echinus* Casey, described originally from New York, is said by Casey (1895, 837) to be " in reality from Arizona, the label being erroneous." Dury has recorded it from Cincinnati. It is pale yellow in hue, with much longer elytra, more deeply constricted thorax, more numerous and much longer bristles. Length 4.3 mm.

Tribe II. ANCHONINI.

The species of this tribe, which are nearly all Tropical American, have been associated with the Hylobiini by some authors, but the form of antennæ (Fig 13, *c*) indicates their relationship with Cossoninæ. They are recognized by their globose, deeply inserted, almost smooth head, and the stout, curved, deflexed beak. The eyes in the typical genus are depressed, finely granulated and placed low down on the globular portion of the head, but in *Gononotus* they are more coarsely faceted and placed at the sides of the beak behind, while in *Typhloglymma* they are wanting. These insects are found chiefly under the bark of decaying trees, or by beating dead branches, or beneath driftwood and seaweed on the coast. Some are thickly coated with an earthy incrustation which hides most of their surface sculpture. The scales on the upper surface are more or less setiform and sometimes clubbed at tip and often (in tropical species) arranged in fascicles on the thorax and more elevated portions of elytra.

KEY TO GENERA OF ANCHONINI.

a. Eyes present.
  b. Funicle 8-jointed; eyes placed low down on the globular portion of the head. I. ANCHONUS.
  bb. Funicle 7-jointed; eyes placed at the sides of base of beak. II. GONONOTUS.
aa. Eyes wanting; funicle 7-jointed. III. TYPHLOGLYMMA.

I. ANCHONUS Schön., 1826. (Gr., "strangled or narrow.")

The chief characters of this genus, aside from those mentioned in key, are the subovate, rigid, scabrous body, absence of scutellum and inner wings and contiguous front coxæ. The first joint of funicle is short, second elongate, obconic, 4—8 short, subperfoliate, the outer ones gradually a little thicker; club short, ovate, solid and pubescent in our species. The males are separated from the females by the shorter and less cylindrical apical portion of the beak. Nearly 100 species have been described, mostly from the Antilles or the main land of Tropical America, the genus extending to Chili and the Cocos and Galapagos Islands.

817 (10,844). ANCHONUS FLORIDANUS Schwarz, 1893, 42.

Oblong-oval, convex. Black or piceous, opaque; antennæ, tarsi and often the last three ventral segments reddish; the whole body more or less dirt incrusted. Beak cylindrical, arising abruptly from a globular head, nearly as long as head and thorax, moderately curved; antennal grooves lateral, straight, reaching the lower part of eye; funicle very little longer than scape, club oval, pointed at tip. Head deeply retracted, alutaceous; eyes flat, transverse, rather coarsely granulated. Thorax wider than long, sides broadly rounded, feebly constricted near apex; surface cribrate with a few clavate bristles. Elytra at base not as wide as thorax at middle, ovate, convex, with nine or ten rows of punctures; intervals 3, 5 and 7 subcarinate and with rows of tubercles, intervals 2, 4 and 6 almost flat and with much smaller tubercles; all tubercles and punctures bearing short, clavate yellowish bristles. Ventral segments 1, 2 and 5 coarsely, sparsely punctate, 3 and 4 very short, smooth; legs slender, beset with bristles. Male with first two ventrals broadly concave, beak shorter, punctate throughout, last ventral slightly sinuate at middle of apex. Length 4.1—5.3 mm.

Found in great abundance under deep layers of seaweed on inner shore of Biscayne Bay at Cocoanut Grove, Fla.; May 27—July 17.

818 (——). ANCHONUS DURYI sp. nov.

Form of *floridanus*. Piceous-brown, opaque, usually covered with a dirty brown crust; antennæ, tibiæ and tarsi reddish-brown. Beak stout, cylindrical, strongly curved, as long as thorax, separated from the head by a very wide and deep groove, its surface very coarsely punctate or foveate. Antennæ short, stout, the club smaller more globular. Head smooth; eyes placed very low on its sides, small, flat, finely granulate. Thorax slightly wider at middle than long, sides feebly curved and diverging from base to middle, then rounded to the very deep and broad postapical constriction; disc cribrate with very coarse, close-set punctures or foveæ. Elytra elongate-oval, convex, widest at middle, sides broadly curved from base to apex; striæ with rows of coarse foveæ; intervals each with a row of close-set prominent tubercles, each of which bears a very small yellowish, suberect seta. Abdomen punctate as in *floridanus*. Length 5—6 mm. (*W. S. B.*) (Fig. 114.)

Fig. 114. × 5. (Original by Dury.)

Sarasota, Fla., Jan. 26; two specimens beneath seaweed on the Gulf beach. West Palm Beach, Fla., June 9; numerous specimens taken by Dury in company with *Gonionotus* and *Dryotribus*, clinging to under side of logs and boards on the ocean beach. St. Petersburg, Fla., June 26; U. S. Nat. Museum collection. Notable for its coarse sculpture and the very deep constrictions at base of beak and behind apex of thorax. Named in honor of our long-time mutual friend and noted naturalist, Chas. Dury, of Cincinnati, Ohio.

II. Gonotus Lec., 1876. (Gr., "angle" + "back.")

Small oblong-oval, very coarsely sculptured species having the beak rather slender, nearly as long as thorax, moderately curved, very coarsely, rugosely punctured; antennal grooves lateral, deep, extending to the lower corner of the eyes; antennæ inserted at apical third, scape slender, reaching the eye, first joint of funicle stout, obconical, slightly longer than second, the latter equal to the next two; club small, oval, annulated, thinly pubescent; front coxæ narrowly, middle ones moderately, hind ones very widely separated; first, second and fifth ventral segments long, third and fourth united equal to fifth; tarsi short, stout, third joint broader, bilobed, hairy beneath.

819 (9019). Gonotus angulicollis Suffr., 1872, 181.

Dull pitchy black, without lustre, usually clothed with a thin crust of dark color; antennæ and tarsi reddish-brown. Head very coarsely, rugosely punctured. Thorax about as long as wide, sides bisinuate and suddenly constricted far behind the apex, thus causing two lateral protuberances, one near base, the other more prominent in front of middle; disc uneven, with three feeble carinæ, coarsely granulate, each granule with a central puncture. Elytra elongate-oval, slightly wider than thorax; striæ wide, shallow, very coarsely punctate; intervals narrow, carinate, alternately a little more elevated. Beneath very coarsely punctured. Length 2.5—3.7 mm.

Dunedin, Florida, Jan. 21—April 1. Common on beach of Clearwater Bay, 65 specimens having been taken at one time beneath a partly rotten board. Haulover, Fla., March 16. Jupiter, Key West, Biscayne Bay, Lake Worth and St. Lucie, Fla. Known also from Cuba. Maritime, living in larval and adult stages in old boards and roots, washed up on the shores. (*Riley.*) Described from Florida as *G. lutosus* and placed in Calandridæ by LeConte, but previously described from Cuba as a member of the genus *Anchonus* by Suffrian, as pointed out by Schwarz. (1893, 53.)

III. Typhloglymma Dury, 1901. (Gr., "blind" + "engraved.")

Body stout, subcylindrical, slightly depressed; eyes wanting; beak thick, curved, coarsely punctured, three-fourths as long as thorax, strongly constricted at base; antennal grooves deep, beginning at apical fourth, gradually becoming inferior; scape not reaching constriction at base of beak, funicle 7-jointed, the first longest, the others subequal, gradually wider; club round, pubescent; thorax squarely truncate at base and nearly so at apex; scutellum very minute; elytra elongate-oval, conjointly rounded

at tips; prosternum sharply pointed behind, emarginate in front; front coxæ contiguous, middle coxæ moderately, the hind ones very widely separated; first and second ventral segments united without a trace of suture, third and fourth very narrow, elevated, fifth rather long, rounded at tip; pygidium completely concealed; femora stout, slightly curved, the front ones very shining; tibiæ robust, terminating in a sharp, stout, incurved spur and a smaller blunt one on inner angle. Resembles *Dryotribus mimeticus*.

Champion, in a letter to Dury, suggested that, from the description, this might be an Erirhinid instead of Calandrid where Dury placed it, but in the Biologia he includes it in Anchonini.

820 (——). Typhloglymma puteolatum Dury, Journ. Cin. Soc. Nat. Hist., XIX, 1901, 243.

Dark brown, shining; head globular, lighter brown than body, glabrous, translucent. Thorax slightly longer than wide, sides subparallel, rounded to the broad, feeble apical constriction; disc covered with large, round, shallow foveæ. Elytra with rows of very large, shallow, foveate punctures; intervals very shining, slightly elevated and with rows of erect yellow bristles. Body beneath coarsely foveate. Length, including beak, 4 mm. (Fig. 115.)

Fig. 115. × 11. (After Dury.)

The unique type was found at Batavia Junction, near Cincinnati, Ohio, July 31, 1900; frequent search has failed to produce another. It was taken while sifting debris, from a cavity at the roots of a large oak tree; a spring of cold water flowed out, and the honey-combed center of the tree was occupied by a nest of ants, *Formica pennsylvanica*. "As the wet, muddy debris was sifted on the paper, this beetle staggered out of the mud, like a blind member of a vanishing race, as I believe it is." (*Dury.*)

Tribe III. DRYOPHTHORINI.

Small, coarsely sculptured species, covered with dirt colored crust and having the beak rather slender, longer than head, cylindrical; scutellum invisible; tibiæ slender, not dilated, their terminal hook long. Two genera represent the tribe, *Gononotus*, formerly included, having been transferred to the tribe Anchonini.

KEY TO GENERA OF TRIBE DRYOPHTHORINI.

a. Funicle of antennæ 4-jointed; tarsi 5-jointed; eyes situated on the head. I. DRYOPHTHORUS.

aa. Funicle 5-jointed; tarsi 4-jointed; eyes situated on the beak. II. DRYOTRIBUS.

I. DRYOPHTHORUS Schön., 1826. (Gr., "oak" + "destroyer.")

Here belongs a single small species, resembling those of *Calandra* in form and having the antennæ inserted near the eyes; the club elongate-oval, its apex spongy, joints 1 and 2 of funicle short, obconic, 3 and 4 slightly longer, transverse; metasternum long, its side pieces narrow; first, second and fifth ventral segments very large, third and fourth extremely short; tarsi 5-jointed, differing in this respect from all Rhynchophora except a few species of Scolytidæ.

821 (9015). DRYOPHTHORUS AMERICANUS Bedel, 1885, 192.

Narrowly oval or subcylindrical. Brownish or piceous, opaque, antennæ and legs paler. Beak longer than half the thorax, subcylindrical, above feebly grooved at base, coarsely and closely punctured. Head coarsely, sparsely punctured; eyes oval, transverse, coarsely granulated. Thorax longer than wide, strongly constricted at apical fourth, sides feebly curved, subparallel at base, disc coarsely variolate-punctate. Elytra broader at base than thorax, sides curved, feebly converging to apex; striæ deep, broad, coarsely punctured at bottom; intervals narrow, strongly convex. Length 2.5 mm.

Marshall and Marion counties, Ind., scarce; Oct 14—Nov. 17. Flatbush, Bronxville, Van Cortland Park, Milltown and Ramapo Mts., N. Y., June—August. Throughout New Jersey, winter and early spring, in very old logs and under bark of pine. Sanford, Fla., Jan. 16. Ranges from New England and eastern Canada to Wisconsin, south to Florida, occurring for the most part beneath bark of pine and about wood-piles. The former name, *corticalis*, Say, is preoccupied.

II. DRYOTRIBUS Horn, 1873. (Gr., "oak" + "eater.")

Also represented by a single species resembling the preceding, and having the beak three-fourths as long as thorax, curved, slightly flattened, constricted behind the eyes, coarsely striate-punctate above; eyes small, rounded, coarsely granulated, situated on sides of beak about one-fifth from base; antennæ inserted midway between eyes and apex of beak, scape reaching hind margin of eye, as long as the remaining joints together, funicle 5-jointed, first and second joint obconical, the first the

longer; elytra elongate-oval, narrowed at base and apex; hind coxæ widely separated.

822 (9017). DRYOTRIBUS MIMETICUS Horn, 1873, 433.

Brownish or piceous, opaque; antennæ and tarsi paler. Thorax subcylindrical, one-fourth longer than wide, moderately convex, constricted near apex, sides moderately curved, base as narrow as the constriction; surface very densely variolate-punctate. Elytra elongate-oval, broader than thorax, humeri broadly rounded, sides feebly curved to apical third, then gradually narrowed to apex; striæ broad, coarsely and closely punctured; intervals very narrow, convex, each with a row of rather coarse punctures. Under surface very coarsely and sparsely punctured; legs coarsely punctured and with a few short yellow hairs. Length 2.5 mm.

Dunedin, Fla., April 1; beneath old boards on the Gulf beach. New Smyrna, Biscayne Bay, Lake Worth and Key West, Fla. Also Tortugas. "Maritime; breeds in old boards and roots washed up on the beaches." (*Riley.*) Greatly resembles the preceding species, but easily distinguished by the characters given in key.

Tribe IV. COSSONINI.

Small black or brown, usually glabrous, shining species having the beak as long or longer than head; antennæ inserted at middle or near its tip, their grooves descending rapidly; the antennæ not received in a deep transverse gular groove as in the next tribe; funicle 7-jointed; front coxæ separated by at least one-half their own diameters.

KEY TO EASTERN GENERA OF COSSONINI.

a. Body pubescent.

b. Front coxæ remote, separated by fully their own width; antennæ inserted at or behind the middle of beak.

c. Antennal grooves horizontal, directed against the eyes; pubescence coarse, yellowish; eyes not visible from above. I. HIMATIUM.

cc. Antennal grooves strongly descending, directed beneath the eye; pubescence very fine; eyes visible from above. II. TRICHACORYNUS.

bb. Front coxæ separated by only one-half of their own width; antennæ inserted slightly beyond middle of beak, their grooves oblique, directed beneath the eye. III. CARPHONOTUS.

aa. Body glabrous.

d. Body depressed; beak more or less dilated at tip; antennæ inserted near tip of beak. IV. COSSONUS.

dd. Body not depressed; beak not dilated at tip.

e. Antennæ inserted distinctly behind middle of beak.

f. Form very slender, cylindrical; antennal grooves horizontal, directed against the eyes; beak not longer than head, conical, tapering toward apex. V. MACRANCYLUS.*

*In the Biologia *Macrancylus* is said to belong to the Rhyncolini, but as the front coxæ are widely separated, we retain it here.

ff. Form stouter, more elliptic; antennal grooves rapidly descending, directed beneath the eyes; beak shorter, not tapering. VI. STENANCYLUS.

ee. Antennæ inserted at or in front of middle of beak.

g. Antennal grooves directed toward the eyes; elytral striæ very deep VII. ALLOMIMUS.

gg. Antennal grooves descending obliquely.

h. Body pale, slender, elongate; funicle slender, club large; length 1.5 mm. VIII. STENOMIMUS.

hh. Body black or dark brown, more robust.

i. Funicle gradually stouter, club large. IX. CAULOPHILUS.

ii. Funicle very stout, club small. X. MESITES.

I. HIMATIUM, Woll., 1868.

Small subdepressed linear or feebly wedge-shaped pubescent species, having the head short, almost enclosed in the tubulate apex of thorax; beak parallel, feebly curved, subcylindrical; eyes rather small, flat, coarsely granulated, situated on sides and under surface of head; joints 2—7 of funicle very short, equal, club small, oval, sparsely hairy; metasternum rather long; front and middle coxæ widely separated; tibiæ short, scarcely longer than tarsi, their terminal hook very large; third joint of tarsi feebly dilated.

KEY TO EASTERN SPECIES OF HIMATIUM.

a. Beak feebly curved, shorter than thorax, its sides parallel.

b. Body parallel, reddish-brown or dusky, rather densely and coarsely pubescent; thorax coarsely, sub-confluently punctate; punctures of elytral striæ coarse and approximate. 823. ERRANS.

bb. Body somewhat wedge-shaped, more convex; black, much less pubescent, the punctures of thorax much smaller, distinctly defined; elytral striæ not impressed, the intervals wide. 824. NIGRITULUM.

aa. Beak straight, as long as thorax, cylindrical, not distinctly separated from the head by a transverse impression; color reddish-brown. 825. CONICUM.

823 (9020). HIMATIUM ERRANS Lec., 1876, 427.

Narrow, elongate. Reddish-brown or dusky, nearly opaque, thickly clothed with coarse yellowish hairs. Beak slightly shorter than thorax, rugosely punctured, transversely impressed at base. Thorax subquadrate, depressed, more than one-half longer than wide, widest near base; sides suddenly rounded behind the widest part, gradually obliquely narrowed and nearly straight in front, slightly constricted near apex, disc very densely and coarsely punctured, without median smooth line. Scutellum

very small but distinct. Elytra one-fourth wider than the widest part of thorax, truncate at base, sides parallel to apical third, then rounded to apex; striæ deep, broad, their punctures large, quadrate; intervals very narrow. Body beneath very coarsely punctured, punctures of ventral segments not smaller. Length 2—2.2 mm.

Tyngsboro, Mass., Apr. 18. Newark and Berkeley, N. J., July 6. Ranges from Weymouth, Nova Scotia and New England to Ohio, south to Tallahassee, Fla. Occurs under bark. Inquilinous in the galleries of *Tomicus calligraphus* Lec. under bark of yellow pine. (*Schwarz.*) LeConte says the scutellum is invisible and the elytra not wider than the widest part of thorax, statements which do not agree with the specimens in hand.

A specimen taken at Ft. Myers, Fla., March 21, only 1.5 mm. in length, the beak and thorax as in *errans*, but with longer, coarse, recurved yellow elytral setæ, seems deserving of a distinctive name and may be known as var. *parvula*. (*W. S. B.*)

824 (11,220). Himatium nigritulum Casey, 1892, 691.

Black, elytra somewhat shining; legs, antennæ and apical parts of thorax piceous-brown; vestiture sparse, consisting of erect setiform scales, especially visible on beak and elytral apex. Head smooth; beak three-fourths as long as thorax, opaque, sculptured. Thorax conical, slightly longer than wide, constricted behind the apex, punctures rather coarse, deep, rounded. Elytra with sides feebly curved, disc with unimpressed rows of deep, oblong, close-set punctures; intervals flat, shining, feebly rugose. Beneath densely, coarsely punctate. Length 1.8 mm.

Described from a single Florida specimen.

825 (9021). Himatium conicum Lec., 1880, 218.

Elongate, subconical, narrowed in front from behind the middle of elytra. Color of *errans*. Beak more slender and cylindrical than there, densely punctate. Thorax subconical, not depressed, sides nearly straight and converging from near base to apex, suddenly incurved at base; disc more finely and densely punctate. Elytra as in *errans*, the intervals with coarser more erect clavate yellowish setæ. Length 1.6—2 mm.

South Woodstock, Conn., Oct. 22. Pennington Gap, Va. District of Columbia and southwestern Pennsylvania. Occurs in the bark of the yellow poplar or tulip tree, *Liriodendron tulipifera* L. (*Schwarz*); also beneath that of pine, *Pinus strobus* L., infested by *Tomicus pini* Say. (*Chittenden.*) Though the eyes are concealed in repose by the head being immersed in the thorax, the small but distinct postocular lobes, mentioned by LeConte and repeated by Casey, are not visible in the specimens at hand, and such lobes do not occur in any member of the tribe. Close to

errans, of which Dr. Schwarz considers it a synonym, but separable by the characters above given.

II. TRICHACORYNUS gen. nov. (Gr., "hairy" + "club.")

Elongate subcylindrical species having the beak as long as head, feebly constricted at base; antennæ inserted at basal third, scape clavate, passing middle of eye; funicle 7-jointed, first joint stout, as long as 2 and 3 united, second slightly shorter and narrower than third, 3—7 subequal in length, gradually wider, all broader than long; club stout, oval, densely clothed, except at base, with coarse yellow hairs; eyes large, convex, widely separated, coarsely faceted; front coxæ separated by their own width; tibiæ short, rather slender, armed with a strong hook; tarsi with third joint feebly bilobed, scarcely wider than second. (*W. S. B.*)

826 (——). TRICHACORYNUS BRUNNEUS sp. nov.

Elongate, feebly depressed. Uniform chestnut brown, shining; head, beak, thorax and under surface finely alutaceous; above sparsely clothed with very fine and short yellowish pubescence; beneath almost glabrous. Beak stout, sides parallel, both it and head finely, deeply and sparsely punctate. Thorax subcylindrical, slightly longer than wide, sides incurved near base, then straight and feebly converging to apex; disc very finely, remotely punctate. Elytra subcylindrical, one-third wider and three times as long as thorax; sides straight to apical third, then broadly rounded to apex; striæ almost obsolete, indistinctly serrately punctate; intervals flat, minutely punctate, finely transversely rugose. Under surface very finely and sparsely punctate. Length 2.8 mm. (*W. S. B.*)

Marion County, Ind., Dec. 28. One specimen from side of shed where wood was stored. Very distinct, in its peculiar sculpture and densely pubescent club, from all other members of the tribe..

III. CARPHONOTUS Casey, 1892.
(Gr., "small dry body" + "back.")

This genus was erected for a rather broad, subdepressed pubescent species having the beak stout, straight, parallel, three-fifths as long as thorax, not separated by an impression from the head; basal joint of funicle as long as the next two, 2—7 short, equal in length; scutellum distinct; elytra one-half wider than thorax; metasternum long; tibiæ without internal spur at apex; tarsi rather stout, their third joint dilated and bilobed.

827 (11,223). CARPHONOTUS TESTACEUS Casey, 1892, 694.

Oblong-oval, feebly depressed. Pale reddish-brown, shining; upper surface with short, coarse, very sparse subrecumbent pubescence, becoming erect toward the tips of elytra. Head and beak finely, not densely punc-

tate. Thorax slightly longer than wide, feebly constricted near apex; sides subparallel, very slightly curved; apex broadly, feebly curved, but slightly narrower than base; punctures rather fine but deep, perforate, somewhat sparse, median line obsolete. Elytra twice as long as wide, sides straight and parallel to apical third, then rounded to the obtuse apex; disc with unimpressed rows of large, deep, oblong punctures; intervals flat, narrow, each with a single uneven row of minute punctures. Under surface throughout rather finely, deeply, somewhat densely punctate. Length 2.3—2.8 mm.

Mt. Washington, N. H., beneath spruce bark. (*Blanchard.*) Sault Ste Marie, Ont.; July 21. Little Codroy River and Nicholsville, on Humber River, Newfoundland. (*Bolster.*) Described from Minnesota.

IV. Cossonus Clairville, 1798.

Black or piceous species of moderate size, living beneath the bark of dead trees, and having the body depressed; beak dilated at tip (Fig. 5); antennæ inserted near the tip, their grooves rapidly descending. An interesting fact in connection with their biology is the frequent occurrence with them of species of the genus *Rhyncolus*. They have recently been revised by Dr. Edwin C. Van Dyke, loc. cit. Six of the 15 species recognized by him occur in the Eastern States.

KEY TO EASTERN SPECIES OF COSSONUS.

a. Black, with base of elytra, metasternum and abdomen rufous. 828. HAMILTONI.

aa. Unicolored black or piceous species.

b. Thorax as wide or wider than long, sides usually distinctly curved, surface very unevenly punctured; elytral intervals flat. 829. PLATALEA.

bb. Thorax longer than wide, sides slightly curved or straight.

c. Basal portion of beak longer than dilated portion; elytral intervals feebly convex. 830. SUBAREATUS.

cc. Basal portion of beak equal in length to the dilated portion.

d. Beak elongate, apical portion distinctly wider than basal and rather suddenly dilated.

e. Thorax somewhat wedge-shaped, almost as wide at base as elytra, sides gradually convergent forwards from in front of base, disc concave on basal third, the impression with a median carina. 831. IMPRESSUS.

ee. Thorax not wedge-shaped, its sides almost parallel, disc convex, coarsely and closely punctured, the median line concave near base; intervals strongly convex. 832. CONCINNUS.

dd. Beak broad and short, apical portion more gradually dilated and but little wider than basal; thorax as wide or wider than elytra. 833. CORTICOLA.

828 (——). Cossonus hamiltoni Slosson, Can. Ent., XXXI, 1899, 193.

Black, shining, basal half of elytra, metasternum and abdomen rufous; antennæ and legs dark red. Beak stout, finely and closely punctate, very abruptly and almost transversely quadrangularly dilated at apex, the dilated portion barely as long as the basal. Thorax oblong, with a triangular depression from base to near apex, in which the punctures are coarse and irregular, though smaller and more regular at sides. Elytra slightly wider than base of thorax, surface deeply striate at base, striæ with close deep punctures, but not impressed on apical portion. Length 2.9 mm.

Miami and Ft. Worth, Fla., beneath bark of dead rubber tree, *Ficus aurea* L. First collected by Dr. Hamilton at Ft. Worth. Occurs also in the West Indies.

829 (9023). Cossonus platalea Say, 1831, 24; ibid, I, 292.

Elongate, parallel. Black, strongly shining, antennæ and tarsi reddish-brown. Head rather finely and sparsely punctured. Beak two-thirds as long as thorax, basal portion longer than apical, the latter rather suddenly quadrangularly dilated, finely and closely punctate. Thorax as wide or wider than long, apex rather suddenly narrowed, sides strongly and regularly curved; disc flattened, the punctures at sides denser and finer, at middle somewhat coarser and more distant. Elytra slightly broader than middle of thorax, flattened, striate, rather coarsely and serately punctured; intervals flat, very minutely uniseriately punctate. Length 5.5—6.5 mm. (Fig. 116.)

Fig. 116. × 8. (After Felt.)

Frequent beneath bark of butternut and elm throughout Indiana March 29—Sept. 12. Ranges from New England and Canada south to Virginia, west to Iowa; beneath bark of butternut, walnut, poplar and pine. Van Dyke does not consider the pine a normal food plant. Specimens occur with the sides almost parallel which are very difficult to separate from *subareatus*. Van Dyke says *platalea* can be separated by its "broader thorax, slightly more prominent eyes and shorter basal portion of rostrum."

C. bohemanni Horn, a name proposed for *platalea* Boh. (nec. Say), represents (fide Van Dyke) an atypical specimen or an inaccurate description with which no specimen can be reconciled. The name is therefore to be dropped from our lists.

830 (9024). Cossonus subareatus Boh., Schön., 1845, 266.

Black, shining. Head smooth; beak rather coarsely, closely punctate, one-half as long as thorax, basal portion longer than apical, which is one-third broader than its neck and quadrangularly dilated. Thorax slightly

longer than broad, sides almost parallel at middle, disc unequally punctured, rather finely at sides, coarsely in median area. Elytra but slightly wider than thorax, striæ rather coarsely, serrately punctured; intervals feebly convex, very minutely uniseriately punctured. Length 4.5—7 mm.

Not yet identified from Indiana. Ranges from the "Middle States to Nebraska and Kansas, and from the Lake States to Montana, Washington and California. Apparently confined to broad-leaved trees." (*Van Dyke.*)

831 (9029). Cossonus impressus Boh., Schön., 1838, 1019.

Black, piceous or rufous, shining. Head smooth; beak rather finely and sparsely punctate, scarcely half as long as thorax, basal portion about as long as apical, which is quadrilaterally dilated and broader than long; vertex with a deep, impressed linear puncture. Thorax longer than broad, convergent until near apex, rather closely punctured at sides, more coarsely in triangular depression at base, through which extends a smooth carina which is a little less than one-third the length of thorax. Elytra not wider than thorax, striæ coarsely, serrately punctured; intervals rather flat, indistinctly punctate. Length 3—3.5 mm.

Southern Florida, Cuba, Jamaica and Central America; the more southern specimens darker.

832 (9026). Cossonus concinnus Boh., Schön., 1838, 1006.

Elongate, subcylindrical. Black, shining, antennæ and tarsi piceous. Beak less than half as long as thorax, finely and rather densely punctate, basal portion with a short groove and about equal to apical, the latter abruptly dilated, much wider than long. Thorax slightly longer than broad, sides feebly curved, more strongly near apex; disc convex, with a rather large triangular impression at middle of base, coarsely, evenly and rather densely punctured, the basal depression cribrate and often with a faint carina. Elytra not wider than thorax, deeply striate, striæ coarsely serrately punctured; intervals very narrow, convex, each with a row of minute punctures. Length 3.5—5.5 mm.

Common throughout Indiana; Jan. 18—Nov. 5. Occurs beneath bark of butternut, sycamore and other trees, often in company with *platalea*. Bronxville, N. Y., July, under woody fungus on oak stump. Many localities in New Jersey; May—August. Ranges from Canada to Florida, west to Missouri, under bark of chestnut and other hardwood trees. Both this species and the next have the antennal funicle much stouter than in those which precede, the outer joints wider, the last one-half to two-thirds the breadth of the club.

C. impressifrons Boh. (1838, 100) is a form in which the thorax is evidently narrower than elytra, flatter, with the sides more convergent in front, and with more distinct median carina, but this form grades in-

sensibly into typical *concinnus*. If the examination of the types prove the two to be varieties of one species, the name *impressifrons* will have priority. (*Van Dyke.*)

833 (9027). Cossonus corticola Say, 1831, 24; ibid, I, 291.

Black or piceous, somewhat shining; antennæ and tarsi chestnut brown. Beak less than half the length of thorax, marked with dense elongate punctures, basal portion shorter than apical, which is but slightly dilated; vertex with a deeply impressed, elongate puncture between the eyes. Thorax much longer than wide, sides almost straight from base to apical third, then slightly converging to the feebly constricted apex; disc rather coarsely and closely punctured, often with a narrow median smooth area and a slight depression near base. Elytra elongate, parallel, somewhat narrower than thorax, deeply striate, striæ more coarsely punctured on basal half; intervals as in *concinnus*. Length 4—5 mm.

Frequent beneath bark of pine in northern Indiana; very scarce in the southern counties; June 18—August 26. Van Cortland Park and West Point, N. Y.; July. Newark, Spring Lake, Lakehurst and Anglesea, N. J., under pine bark; April—July. Ormond, Sanford, Dunedin and Sarasota, Fla.; common beneath bark of dead pine; Jan. 12—Apr. 11. Ranges from New England and Canada to Missouri, south to Florida, Mexico and Guatemala, its normal food plant being pine. The Florida specimens are smaller and paler than those from Indiana, being more often piceous-brown than black. In addition to the very different form of beak, *corticola* has the elytra less deeply and broadly striate than in *concinnus*. The thorax is less convex, with smaller impression near base and more sparsely and irregularly punctate than there, and the median smooth line is better developed, being sometimes nearly entire. The median groove of beak is longer and much more distinct in *concinnus*, usually extending onto the apical dilated portion.

V. Macrancylus Lec., 1876. (Gr., "large" + "curve.")

Our only member of this genus is a slender-bodied, cylindrical species having the beak stout, as long as head, not separated from the front; antennæ inserted near the base close to the eyes, which are round, not prominent, finely granulated; scape long, clavate, reaching hind border of eye, first joint of funicle larger and thicker, the others very short, wide, closely united; scutellum distinct; front coxæ widely separated; tibiæ gradually dilated and with a spine at inner apical angle; tarsi rather broad, the last joint longer than the others united, claws large, divergent.

834 (9031). Macrancylus linearis Lec., 1876, 339.

Very elongate, cylindrical. Piceous or brown, shining, glabrous; antennæ and legs reddish-brown. Head and beak finely punctured. Thorax subcylindrical, more than one-half longer than wide, slightly narrowed in front, disc finely, not densely punctured, without impressions, its sides rounded near the base. Elytra not wider than thorax, striæ rather wide, shallow, much deeper on the posterior declivity, their punctures rather coarse, serrate, close-set; intervals narrow, convex. Under surface distinctly but finely punctured; flanks of thorax feebly concave in front. Length 2.5—3 mm.

Dunedin, Fla., scarce beneath drift on the beach of bay; Jan. 21—March 21. A strictly maritime and semitropical species, first found by Hubbard and Schwarz at Haulover, Fla., in March, when it was abundant on the sea shore under boards. A colony of 30 or 40 were found by Schwarz under a log at Padre Island, Texas. Eleven taken under drift and 50 more on the under side of a wide, flat oak plank, June 29, at same place by Wickham. Occurs only on open coast, not lagoons, under driftwood which is partly soft, so the larvæ can cling to it. (*Townsend*, 1903.) Occurs also in West Indies and Hawaiian Islands.

VI. Stenancylus Casey, 1892. (Gr., "narrow" + "curve.")

Elongate, narrowly oval species having the head rather elongate, conical; beak short, broad, parallel, not constricted at base; basal joint of funicle as long as the next two, second to seventh short, subequal, feebly increasing in width; eyes very convex, prominent, coarsely granulated; front coxæ widely separated.

835 (11,222). Stenancylus colomboi Casey, 1892, 693.

Elongate, narrowly oval, convex. Pale rufo-piceous throughout, glabrous, polished. Head and beak continuous, finely, not densely punctate; beak two-fifths as long as thorax, straight. Thorax slightly longer than wide, broadly, feebly constricted near apex, sides feebly curved, disc finely unevenly punctured without trace of median line. Elytra wider and more than twice as long as thorax, sides parallel and straight to apical third, then convergent and sinuate to the narrowly obtuse apex; striæ coarsely feebly impressed, coarsely punctate; intervals narrow, finely uniseriately punctate. Beneath coarsely punctate. Length 2.2—2.4 mm.

Lake Okeechobee, Fla., March 6—8. Biscayne Bay and Cape Jupiter, Fla., April 20. West Indies. Lives in the roots of *Acrostichum aureum* L., a very large brackish-water fern growing along the coasts of Florida. (*Schwarz.*)

VII. ALLOMIMUS Lec., 1876. (Gr., "different" + Mimus.)

Very small, elongate-oval, coarsely sculptured species having the beak stout, subcylindrical, narrower than head; eyes small, rounded, convex, rather coarsely granulated; scape short, strongly clavate, reaching front margin of eye, first joint of funicle a little larger and stouter, remaining joints short, closely united, gradually but slightly broader; club large, oval, pointed, pubescent; scutellum distinct; front coxæ widely separated; tibiæ with a small spine at inner angle, the terminal hook long. The genus is consolidated with *Stenomimus* in the Biologia.

836 (9032). ALLOMIMUS DUBIUS Horn, 1873, 442.

Narrowly oval. Dark reddish-brown, shining, antennæ and legs paler. Beak two-thirds as long as thorax, slightly broader at tip, sparsely, at base more coarsely, punctured. Thorax conical, slightly longer than wide at base, sides feebly curved near base, then gradually converging to apex; disc slightly convex, coarsely, deeply and densely punctate, often with a narrow smooth line at middle. Elytra at base slightly wider than thorax, sides straight to apical fourth, then obliquely narrowed to the slightly prolonged and obtusely rounded apex; striæ very deep, coarsely serrately punctured, the eighth united with the seventh behind the humeri; intervals narrow, convex, finely, uniseriately punctate. Beneath coarsely punctured. Length 2—2.8 mm.

Crawford County, Ind., rare; May 25 . Known also from Ohio, Michigan, Illinois, Texas and Florida. Occurs beneath bark of dead or decaying trees and that of the mustang grape vine.

837 (9047). ALLOMIMUS CORTICALIS Boh., Schön., 1845, 284.

Smaller and more slender than *dubius*. Color as there. Thorax more narrow, its sides converging from base; disc with punctures finer, much less dense and with a faint impressed line instead of a smooth raised one at middle. Elytral striæ less deep, their punctures finer, less serrate. Length 1.8—2 mm.

Crescent City, Fla. Described from "Carolina." Very close to *dubius* and if it proves to be the same, Boheman's name will have priority.

VIII. STENOMIMUS Woll., 1873. (Gr., "narrow" + Mimus.)

Very small, slender pale species having the beak cylindrical, feebly curved, one-half as long as thorax; antennæ inserted at middle of beak, scape barely reaching the eyes which are rather large, convex, coarsely granulated; front coxæ widely separated. One species, the smallest of the subfamily, occurs with us.

838 (9033). STENOMIMUS PALLIDUS Boh., Schön., 1845, 279.

Linear, strongly depressed. Pale reddish-yellow, shining. Beak sparsely punctured and with an impressed point between the eyes. Thorax oblong, sides gradually divergent from apex, base slightly narrower and feebly curved; disc depressed, finely and rather sparsely punctured. Elytra at base as wide as thorax, sides parallel to apical fifth; disc subdepressed, striæ fine, their punctures rather coarse, close-set; intervals moderately convex, each with a row of very minute punctures. Beneath sparsely punctured. Length 1.5 mm.

Vigo County, Ind., Jan. 7; a dozen or more gregarious beneath the bark of a dead walnut snag. Riverside, Ill., Apr. 25. Ranges from Pennsylvania and Ohio to Illinois and southward. Eight examples were taken at one time, on May 11, near Cincinnati, Ohio, in a wounded part of a living hickory, and on another occasion adults and larvæ were numerous in the moist fibres beneath the bark of the black walnut, *Juglans nigra* L. (*Dury.*)

IX. CAULOPHILUS Woll., 1854. (Gr., "stalk" + "to love.")

Small, convex, subcylindrical, deeply sculptured species having the beak broad, cylindrical, feebly curved; eyes large, convex; antennæ inserted at middle of beak, their grooves oblique, descending; scape reaching front of eyes, funicle slender, its outer joints gradually wider (Fig. 117, *b*); scutellum distinct.

839 (9034). CAULOPHILUS LATINASUS Say, 1831, 30; ibid, I, 299.

Elongate, rather robust. Reddish-brown or piceous, feebly shining. Beak longer than half the thorax, sparsely punctured, with a faint elongate fovea between the eyes. Thorax as broad as long, moderately constricted near apex, sides strongly curved, base slightly narrowed, feebly bisinuate; disc rather finely and evenly punctured, with a broad, faint impression on basal third. Elytra subcylindrical, not wider than middle of and more than twice as long as thorax, moderately convex; striæ deep, rather coarsely and closely punctured on basal half, more finely or obsoletely near apex, the seventh and eighth united behind the humerus as in *Allomimus;* intervals convex, indistinctly punctulate. Under surface sparsely punctured. Front tibiæ sinuate within. Length 3 mm. (Fig. 117.)

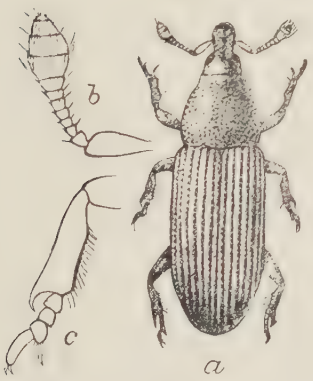

Fig. 117. *a*, Beetle × 12; *b*, antenna; *c*, hind leg. (After Chittenden.)

Dunedin, Fla., Mar. 29; beaten from oak. Recorded from South Carolina, Georgia and Florida; also West Indies, Mexico and Guatemala. Known as the "broad-nosed grain weevil,"

the larvæ feeding upon dried cereals and other food materials. Chittenden (1911) states that it was first recorded as "beaten from dead twigs," (*Schwarz*), and "as living under the bark of dead and decaying wood," (*Riley*), as do most other Cossonids. In 1895 it was found to be attacking chick-peas at the Atlanta exposition, and since then has become known as an enemy of Indian corn and the seeds of the alligator pear. *Cossonus pinguis* Horn and *Caulophilus sculpturatus* Woll. are synonyms.

X. Mesites Schön., 1837. (Gr., "intermediate.")

Elongate subcylindrical species having the beak slender, subterete, male, cylindrical, female, twice as long as head, deflexed, feebly curved; antennæ inserted about or slightly behind the middle, club small, short, ovate; funicle stout, second joint short; thorax oblong, narrowed in front, moderately convex above, both base and apex truncate; scutellum round, minute; elytra convex, elongate, subcylindrical; tibiæ armed at outer angle of apex with a strong curved claw and at inner angle with a short spine.

KEY TO SPECIES OF MESITES.

a. Elytra black, their intervals with two irregular rows of rather coarse punctures. 840. SUBCYLINDRICUS.

aa. Elytra red, intervals each with a single irregular row of small punctures. 841. RUFIPENNIS.

840 (9035). Mesites subcylindricus Horn, 1873, 441.

Subcylindrical. Black or piceous, shining. Beak slightly longer than half the thorax, very feebly curved, terete, coarsely punctured, finely grooved above and with an impressed puncture between the eyes. Antennæ stout, club scarcely broader than funicle. Thorax longer than wide, apex feebly constricted, sides broadly curved, base slightly narrowed; disc convex, coarsely and unevenly punctured, the median line and an oval space on each side in front of middle smooth. Elytra not wider than thorax, nearly cylindrical; striæ moderately deep, coarsely not serrately punctured; intervals feebly convex, each with two irregular rows of rather coarse punctures, those at apex more rugulose. Beneath moderately punctured. Length 6.5 mm.

Flatbush, N. Y.; "from a Dutch dictionary." (*Zabriskie.*) Cape May and Anglesea, N. J., under bark of washed up pine logs; July. On seashore at Cape Henlopen, Del.

841 (9036). Mesites rufipennis Lec., 1878, 432.

Elongate, cylindrical. Black, glabrous, shining; elytra pale red, their tips often dusky; antennæ, beak and legs reddish-brown. Head and dilated base of beak very finely and sparsely punctured, the former with a

large deep fovea, the latter with a short, groove. Thorax oblong, longer than wide, slightly narrower in front, sides broadly rounded, more so at base and apex; disc rather coarsely, not densely punctured. Elytra scarcely wider than thorax; striæ rather shallow, with rows of close-set quadrate punctures; intervals not wider than striæ, punctured as mentioned in key. Beneath coarsely punctured; ventral segments 1—4 sparsely and less coarsely punctured. Length 5—5.3 mm.

New Smyrna and Lake Worth, Fla., one specimen at each place on ocean beach. St. Simon Island, Ga.; April 22—May 12. More depressed, with the elytral intervals less convex and more finely punctate than in *subcylindricus*.

Tribe V. RHYNCOLINI.

Small cylindrical species resembling certain Scolytidæ in general appearance and agreeing in the following principal characters; antennal grooves beginning near the tip of beak (except in *Tomolips* and *Stenoscelis*) and descending obliquely below the eyes, the latter with a deep transverse gular groove in front beneath, which receives in part the antennæ in repose; beak short, broad, usually continuous with the head; prosternum very narrow between the coxæ. The distribution is principally northern, though a number of species are known from Florida. We regard the narrowly separated front coxæ as a more important character than the length of beak, and hence retain *Phlœophagus* in this tribe.

KEY TO EASTERN GENERA OF RHYNCOLINI.

a. Beak half or more the length of thorax; funicle 7-jointed. I. PHLŒOPHAGUS.

aa. Beak distinctly less than half the length of thorax.

b. Funicle 5-jointed.

c. Beak slightly narrowed from base to tip, not separated from head by a transverse impression; club truncate at tip; sculpture very coarse. II. TOMOLIPS.

cc. Beak not narrower at tip than base, separated from the head by a broad, transverse impression; club not truncate.

d. First joint of funicle very large, almost wholly enclosing the second; club slender, gradually formed. III. PSEUDOPENTARTHRUM.

dd. First joint of funicle moderate, not concealing the base of second; club abruptly formed. IV. PENTARTHRINUS.

bb. Funicle with more than five joints.

e. Funicle 6-jointed; club nearly solid; beak much longer than head. V. HEXARTHRUM.

ee. Funicle 7-jointed.

f. Elytra distinctly striate; form more robust.

g. Beak at least as long as head, its antennal grooves beginning near the tip; tarsi usually dilated. VI. RHYNCOLUS.

gg. Beak much shorter than head, its grooves reduced to deep postmedian pits; tarsi narrow. VII. STENOSCELIS.

ff. Elytral striæ, except sutural one, obsolete; form very slender; beak less than half the length of head. VIII. LIOLEPTA.

I. PHLŒOPHAGUS Schön., 1837. (Gr., "bark" + "eater.")

Antennæ inserted at middle of beak, scape impinging more or less on the eyes; two basal joints of funicle obconic, each one-half longer than third, 3—7 short, subequal, gradually slightly wider; beak rather stout, feebly curved; thorax oblong, narrowed from base toward apex; scutellum small, rounded; elytra elongate, convex above, their base truncate; third tarsal joints moderately dilated and slightly emarginate at tip.

KEY TO AMERICAN SPECIES OF PHLŒOPHAGUS.

a. Body glabrous; beak half the length of thorax.

b. Black or piceous; thorax densely punctate.

c. Beak widest at insertion of antennæ; elytral striæ deep, coarsely serrately punctured. 842 APIONIDES.

cc. Beak cylindrical, feebly tapering from the base; striæ with coarse, quadrate, not serrate punctures. 843. VARIOLATUS.

bb. Reddish-brown; thorax sparsely punctured; elytral striæ broad, not deep, punctures coarse, not serrate. 844. MINOR.

aa. Body pubescent; beak three-fourths as long as thorax. 845. SPADIX.

842 (9037). PHLŒOPHAGUS APIONIDES Horn, 1873, 443.

Elongate-oval. Black, moderately shining. Beak half the length of thorax, febly curved, cylindrical, finely punctate. Head almost smooth. Thorax subcylindrical, very little longer than wide, sides feebly curved; disc convex, coarsely and closely punctate. Elytra at base one-third broader than thorax; humeri prominent; sides straight and parallel for two-thirds their length, apex slightly prolonged and obtusely rounded; striæ as given in key; intervals narrower than striæ, convex, slightly irregular on their summits. Under surface coarsely and densely punctured. Length 3 mm.

Marquette, Mich., May 7. Ranges from New England and Canada to Michigan, south to District of Columbia. Occurs on wild cherry and ash, (*Beutenmüller*); on dead twigs, (*Ulke*).

843 (——). PHLŒOPHAGUS VARIOLATUS Dury, Journ. Cin. Soc. Nat. Hist., 1916, 14.

Elongate, subcylindrical. Piceous, shining, legs and antennæ paler. Beak cylindrical, distinctly tapering, finely and sparsely punctate. Head finely punctured; thorax longer than wide, sides slightly curved, disc deeply, coarsely and closely punctate and with a narrow smooth median line. Elytra about twice as long as thorax, striæ with coarse, quadrate punctures; intervals as wide as striæ, each with a row of very fine punctures. Beneath with sparse, coarse variolate punctures. Length 2.5 mm.

Cincinnati, Ohio, frequent on standing dead beech trees; May—July.

844 (9038). Philœophagus minor Horn, 1873, 443.

Reddish-brown, shining. Beak stout, not curved, finely and rather sparsely punctate. Thorax slightly longer than wide, sides feebly curved, more strongly near base, disc convex, gradually broader behind the middle, rather finely, evenly, not densely punctate. Elytra one-fourth wider than thorax, sides parallel to apical fourth, apex broadly rounded, surface convex; striæ not deep and gradually feebler to apex, coarsely but not serrately punctured, becoming obsoletely so toward apex; intervals feebly convex, the eighth uniting with the seventh behind the humeri, each with a row of minute punctures. Beneath sparsely and finely, the flanks of thorax more coarsely punctured. Length 2—2.5 mm.

Fort Lee, Newark and Anglesea, N. J.; July. Buffalo, N. Y. Ranges from New York to Michigan and Nebraska, south to Virginia. Occurs in the decaying trunks of birch, willow and elm, (*Chittenden*); on dead twigs, (*Ulke*).

845 (11,225). Philœophagus spadix Hbst., 1795, 256.

Elongate-oval, subconvex. Dark reddish-brown, almost shining, thinly pubescent with suberect grayish-yellow hairs; antennæ and legs paler. Beak stout, broad, finely and densely punctate. Thorax subcylindrical, as wide as long, sides broadly rounded, disc coarsely, densely and rather shallowly punctate, with trace of a median smooth line. Elytra crenately striate; intervals rugulose, very finely punctate. Length 3 mm.

Rockaway Beach, Long Island, N. Y.; on seashore in water-soaked driftwood. West Bergen and Brigantine Beach, N. J., June 23. An imported species not yet commonly found in this country.

II. Tomolips Woll., 1873. (Gr., "to cut" + "desiring.")

Stout cylindrical species having the beak slightly longer than head, robust, subcylindrical, not curved; antennal grooves deep, commencing at middle, rapidly descending, passing entirely beneath the eyes and distant from their lower edges; antennæ stout, scape short, not more than half the length of the remaining joints united; first joint of funicle stout, longer than the others, 2—5 subequal, broader than long; club round, glabrous, shining, truncate at tip; scutellum small, rounded; legs short, robust; tarsi nearly as long as the tibiæ, slender, third joint not bilobed, fourth as long as the others united; front and middle coxæ narrowly separated.

A genus remarkable in the structure of its antennæ, the species

of which superficially resemble *Hylastes* and other genera of Scolytidæ. The name *Tomolips* antedates *Wollastonia* Horn, which is also preoccupied for a fossil beetle described by Heer. *Wollastoniella* proposed by Cockerell (1906, 243) is therefore needless.

846 (9039). TOMOLIPS QUERCICOLA Boh., Schön., 1845, 281.

Black, shining; antennæ and tarsi reddish-brown; legs piceous. Beak finely punctured at tip, more coarsely but less densely at base. Thorax longer than wide, nearly cylindrical, very slightly narrowed in front, surface very coarsely, not densely punctured. Elytra cylindrical, scarcely wider than thorax, humeri moderately prominent, tips with margin slightly prolonged and feebly reflexed; striæ deep, especially so near apex, their punctures coarse, deep, moderately closely placed; intervals narrow, convex, their crests undulating, each with a single irregular row of very fine, remote punctures. Body beneath coarsely variolate-punctate. Front tibiæ simply mucronate at inner apical angle in both sexes. Length 3 mm.

Marion and Posey counties, Ind., scarce; March 17—June 3; sifted from debris of rotten beech stumps. Landisville and Anglesea, N. J., July 14; breeding in dead wood of various trees. Ranges from New England to Indiana, south and southwest to Florida, Texas and Guatemala.

III. PSEUDOPENTARTHRUM Woll., 1873.
(Gr., "false" + Pentarthrum.)

Stout, robust black species having the beak as long as head, stout, its sides parallel; eyes feebly convex, finely faceted, visible from above; antennæ inserted at basal third, joints 2—5 of funicle wider than long, closely united, club but slightly wider than funicle, compressed; legs short, stout; fourth joint of tarsi very slender, curved.

847 (——). PSEUDOPENTARTHRUM SIMPLEX Casey, 1892, 697.

Subcylindrical, rather robust. Black, glabrous, antennæ and tarsi reddish-brown. Beak and head finely and rather closely punctate, separated by a wide, distinct transverse impression. Thorax as wide as long, widest at middle, sides rather strongly rounded, disc finely, deeply and densely punctate, minutely alutaceous without smooth median line. Elytra as wide at base as thorax at middle, sides straight and parallel for three-fourths their length; striæ with coarse, rather close-set punctures; intervals feebly convex, each with a row of minute punctures. Under surface coarsely, abdomen finely punctate. Length 2.5—2.8 mm.

Perry Co., Ind., May 23. Meridian, Miss, June 19. Easily distinguished by the 5-jointed funicle with very large basal joint, narrow club, and thorax with apex and base much narrower than middle.

IV. Pentarthrinus Casey, 1892. (Gr., "five" + "joints.")

Body subcylindrical or feebly wedge-shaped, convex, glabrous; beak short, thick, parallel, separated from the head by a broad shallow transverse impression; eyes convex, distant from the thorax, finely granulated; antennæ inserted at basal third, their grooves deep, wide, horizontal almost to eye, then dilated and bent downwards; funicle 5-jointed, basal joint large, the others obconical, subequal, wider than long; scutellum distinct; ninth and tenth elytral striæ united behind the humeri; front coxæ very narrowly separated; legs short, tarsi slender. This genus is said in Biologia to be doubtfully distinct from the preceding, but Casey states that *Pseudopentarthrum* differs in its relatively larger thorax, greater distance between the antennal grooves and eyes, more compact and compressed antennæ, less abrupt club and stouter legs. All the known species occur in our territory.

KEY TO SPECIES OF PENTARTHRINUS.

a. Front coxæ almost contiguous but not in actual contact; beak not impressed in basal half.

b. Thorax rather coarsely, deeply and conspicuously punctate, the interspaces between the punctures highly polished.

c. Elytral intervals twice as wide as striæ, flat, each with an irregular row of very sparse, minute punctures. 848. NITENS.

cc. Elytral intervals narrow, not wider than striæ, each with a single row of fine but distinct punctures, more or less confused on the sutural interval. 849. PARVICOLLIS.

bb. Thorax finely alutaceous, sparsely, less deeply and much more finely punctate; elytral intervals very narrow, polished, strongly convex, the punctures of the single row remote, very minute. 850. PICEUS.

aa. Front coxæ narrowly though quite evidently separated.

d. Beak narrowly impressed along the median line in basal half or more; elytral striæ feebly impressed, their intervals flat, as wide as striæ. 851. ATROLUCENS.

dd. Beak not impressed; striæ deep, their intervals very narrow, convex. 852. ANONUS.

848 (9040). Pentarthrinus nitens Horn, 1873, 434.

Black, shining. Beak half as long as thorax, finely punctured, its basal impression with a rather deep fovea. Thorax as wide as long, oval, base slightly wider than apex, sides broadly curved from near the base; disc moderately convex, coarsely, evenly, not densely punctured. Scutellum small, smooth. Elytra oblong, one-fourth wider than thorax, sides feebly curved; disc slightly broader behind the middle, constricted near apex; striæ feebly impressed, rather coarsely and closely punctured; intervals as in key. Body beneath shining, coarsely and sparsely punctured, abdomen more finely punctured. Length 2.5—3.3 mm.

Occurs abundantly on dead twigs in Florida; also in the District of Columbia in dead branches of grape vine. (*Ulke.*) Recorded also, perhaps erroneously, from Ohio. Readily distinguishable from the other species by the much broader elytral intervals and the well marked frontal fovea. (*Casey.*) Placed in *Amaurorhinus* by Horn, erroneously according to Casey.

849 (11,229). PENTARTHRINUS PARVICOLLIS Casey, 1892, 699.

Rather short and robust, feebly wedge-shaped, convex. Black or piceous, polished, legs and antennæ reddish-brown. Beak very short, one-third as long as thorax, rather coarsely, deeply and closely punctate. Thorax small, oval, strongly convex, as long as wide, sides evenly and strongly curved, disc punctate as in key, more closely and coarsely than in *nitens*. Elytra two-thirds wider than thorax, slightly wider behind the middle than at base; striæ feebly impressed, very coarsely and closely punctate; intervals as in key. Length 2.1—2.5 mm.

Pennsylvania, Virginia, New Jersey, in dead wood of various trees. (*Chittenden.*) Reared from apple wood, May 2—29, at Flatbush, N. Y. (*Zabriskie.*) Easily distinguished by its rather shorter, broader elytra, small oval thorax and very coarse punctuation.

850 (11,230). PENTARTHRINUS PICEUS Casey, 1892, 700.

Cylindro-cuneate, strongly convex. Piceous, the elytra polished. Beak nearly half as long as thorax, finely and sparsely punctate, its transverse impression with a small, feebly impressed frontal fovea. Thorax as wide as long, sides broadly curved, converging and feebly sinuate toward apex, punctate as in key. Elytra distinctly wider than thorax; striæ deeply impressed, rather coarsely not closely punctate. Length 2.6 mm.

Marion Co., Ind., rare; Nov. 28. Recorded from Ohio. Described from Florida. "This species may be known by its fine punctuation and piceous-brown color." (*Casey.*)

851 (11,231). PENTARTHRINUS ATROLUCENS Casey, 1892, 700.

Narrow, feebly wedge-shaped, strongly convex. Dark reddish-brown to black, shining, and glabrous throughout, antennæ and legs paler. Head and basal half of beak finely and very sparsely punctate; beak two-fifths as long as thorax, its apical half more closely punctate. Thorax as long as wide, sides broadly rounded from base to apical third, then converging and constricted to apex; disc convex, coarsely, deeply, not densely punctate, the apical margin smooth, rufescent. Elytra nearly one-third wider than thorax; striæ coarse, feebly impressed, their punctures coarse, round, not very close-set; intervals nearly flat, slightly wider than strial punctures, very finely punctate. Length 2.3—2.6 mm.

Enterprise and Biscayne Bay, Fla., June 23—Oct. 11. Differs from *nitens* by its smaller size, narrower form, coarser striæ, larger punctures and sculpture of beak. (*Casey.*)

852 (——). PENTARTHRINUS ANOXUS sp. nov.

Elongate, subcylindrical, feebly depressed. Black or piceous, shining, antennæ and tarsi reddish-brown. Beak slightly longer than head, distinctly wider at tip than base, both it and head finely and closely reticulate-punctate. Thorax narrow, subcylindrical, slightly longer than wide, sides broadly rounded from base to apical constriction; disc coarsely, shallowly and very densely punctate, except on apical fifth, which is rufescent and almost smooth. Elytra one-third wider at base than thorax; sides parallel for two-thirds their length; striæ deep and with rows of coarse, close-set serrate punctures; intervals as in key, each with a row of minute punctures. Under surface coarsely and sparsely punctate. Length 2.5 mm. (*W. S. B.*)

Lake Okeechobee, Fla.; March 1—8. Beaten from dead limbs of custard apple, *Anona glabra* Dunal. The slender body, deep, coarsely punctured striæ, peculiar sculpture of thorax and wider tip of beak distinguish this from all the others.

V. HEXARTHRUM Woll., 1860. (Gr., "six" + "joint.")

Beak slightly longer and narrower than head, somewhat triangular; antennæ very short and thick, scape short, strongly clavate, first joint of funicle stout, its apex truncate, 2—6 longer, subequal, closely united; club nearly solid, oval or rounded, obtuse at tip; tarsi short, the third joint scarcely dilated.

853 (9041). HEXARTHRUM ULKEI Horn, 1873, 446.

Subcylindrical. Piceous or dark reddish-brown, moderately shining. Beak densely and finely striato-punctate; eyes small, flat. Thorax as wide as long, slightly narrower in front, sides feebly curved, base slightly narrower and subtruncate; disc coarsely and rather densely punctured. Elytra slightly wider than thorax, cylindrical, surface feebly striate, striæ with coarse punctures, closely placed but serrate; intervals flat, each with a single row of fine punctures. Body beneath coarsely and sparsely punctured. Front coxae almost contiguous. Length 2.5—3.2 mm.

New York City in December, from spruce lath (*Joutel*); from white pine (*Zabriskie*). Newark, N. J. "Found in houses in New York and Washington, D. C., and introduced." (*LeConte.*)

VI. RHYNCOLUS Germar, 1824. (Gr., "beak" + "maimed.")

Moderately elongate, subcylindrical species having the beak as long or slightly longer than head, robust, not or very feebly curved; antennæ robust, scape short, not passing middle of eye,

joints of funicle transverse, closely united, club gradually formed; seventh and eighth elytral striæ united behind the humerus. Van Dyke (1915) has pointed out that in many cases they accompany species of *Cossonus*. *R. oregonensis* living more or less in company with *C. crenatus*, though generally preferring the dryer parts of the tree; *R. pallens* with *C. lupina*, and *R. brunneus* with *C. piniphilus*. LeConte (1876, 340) has noted the resemblance these species bear to certain Scolytidæ (*Hylastes*), and the strong actual approximation, as indicated by the shortened beak, number of funicular joints, etc.

KEY TO EASTERN SPECIES OF RHYNCOLUS.

a. Funicle of antennæ very stout, second joint apparently very short, enclosed in apical cavity of first; joints 2—7 strongly transverse; elytral striæ deep, their punctures coarse and serrate.
854. OREGONENSIS.

aa. Funicle moderately stout, second joint at least as long as third, joints 2—7 moderately transverse; elytra feebly striate.

b. Beak with median groove; elytral intervals feebly convex, not carinate; first ventral segment coarsely and densely punctate.
855. BRUNNEUS.

bb. Beak not grooved; intervals finely and sharply carinate; first ventral finely and sparsely punctate. 856. CARINATUS.

854 (9043). RHYNCOLUS OREGONENSIS Horn, 1873, 445.

Subcylindrical. Black, shining; legs and antennæ dark reddish-brown, club paler. Beak not longer than head, as wide as long, densely punctured and usually with a small median smooth space. Thorax slightly longer than wide, feebly but distinctly constricted near apex; sides very slightly curved, more strongly near base which is slightly narrower than apex; disc rather coarsely, evenly and confluently punctate. Elytra scarcely wider than thorax, sides parallel, the apex obtusely rounded; striæ as in key; intervals narrow, convex or subcarinate, each with a row of minute, very remote punctures. Under surface rather coarsely, deeply and densely punctate. Length 2.8—3.5 mm.

Marion County, Ind., rare; Nov. 17. Anglesea, N. J. Sanford and Dunedin, Florida; Jan. 1—April 11, beneath bark of dying pine and by beating in wet hammock. Ranges from New Jersey to Michigan, Oregon and California, south to Florida. The Florida specimens are somewhat shorter and more slender than those from Indiana, and two of the four have a narrow smooth space at middle of thorax, but other appreciable differences are absent. They probably represent what Casey (1892, 707) has described as *discors*, as the characters shown in his description differ very slightly if at all from those of *oregonensis* as described by Horn.

855 (9044). RHYNCOLUS BRUNNEUS Mann., 1843, 295.

Subcylindrical. Dark reddish-brown or piceous, feebly shining. Beak slightly narrower and scarcely longer than head, rather densely punctured. Thorax longer than wide, sides broadly rounded, feebly constricted near apex; disc convex, rather coarsely, deeply, not densely punctured. Elytra convex, slightly wider than thorax, sides parallel to apical fifth, then narrowed to apex; lateral striæ more feeble than those near suture, all rather coarsely and closely punctured; intervals each with a row of minute punctures, finely transversely wrinkled. Beneath coarsely punctured, first ventral at middle very densely so. Length 3—3.5 mm.

Ithaca, N. Y., April 15. Tyngsboro, Mass., April 21—July 2. New Jersey, under bark of wild cherry, *Prunus serotina* Ehrh. A species of northern range occurring from New England and Canada to Wisconsin, Vancouver, California and New Mexico.

856 (——). RHYNCOLUS CARINATUS sp. nov.

Subcylindrical. Uniform dark chestnut brown, club and tarsi paler. Beak as long as head, slightly narrowed toward tip, both it and head finely and sparsely punctate. Thorax convex, as long as wide, sides feebly curved, disc finely and densely punctate. Elytra one-fourth wider at base than thorax, sides straight and parallel to apical fourth, then broadly rounded to tips; striæ with rows of small, close-set punctures; intervals raised along the outer side of these punctures into a very narrow ridge or carina; a row of minute punctures on the innner side between each row of strial punctures and the next inner carina. Under surface finely and sparsely punctate. Third joint of tarsi not dilated. Length 2.3—2.5 mm. (*W. S. B.*)

Kosciusko County, Ind., June 20—22; sifted from sphagnum moss in a tamarack marsh. Very distinct by the peculiar sculpture of elytra. The narrow tarsi indicate a distinct genus, but aside from these its characters agree with those of *Rhyncolus*.

VII. STENOSCELIS Woll., 1861. (Gr., "narrow" + "tibiæ.")

Subcylindrical robust species having the beak very short, half the length of and somewhat narrower than head; antennal grooves limited to a short broad cavity just in front of eyes; scape short, slender, feebly clavate, scarcely half the length of funicle; club rounded, slightly flattened, obscurely annulated.

857 (9048). STENOSCELIS BREVIS Boh., Schön., 1845, 282.

Robust, subcylindrical. Black, feebly shining; elytra and legs brownish or piceous, antennæ and tarsi paler. Beak and head rather coarsely and very densely punctured. Thorax short, nearly one-half wider than long, broadly constricted in front, sides feebly curved, base slightly narrower, the hind angles rounded; disc convex, coarsely and densely punctured. Elytra cylindrical, finely granulate at base over a short, broad area each

side of scutellum; sides parallel, obtusely rounded at apex; striæ broad, coarsely and serrately punctured; intervals narrower, feebly convex, their summits uneven, each with a row of fine, remote punctures. Under surface coarsely and sparsely punctured. Length 2.8—3.2 mm.

Frequent throughout Indiana; June 15—July 30; taken beneath bark and by sifting rotten wood. Flatbush, N. Y. Hudson and Ocean counties, Ft. Lee and Newark, N. J.; May. Ranges from New England and Canada to Michigan and Kansas, south to Florida. Reared from apple wood by Zabriskie in May and June. Found in the dead wood of most deciduous forest trees.

VIII. LIOLEPTA gen. nov. (Gr., "smooth" + "slender.")

Very slender glabrous species having the beak less than one-third the length of head, not constricted at base, its antennal grooves strongly descending; scape stout, clavate, reaching hind border of eye; first joint of funicle stout, obconical, twice as long as second, 2—7 subequal in length, gradually slightly wider; club abrupt, oval, robust, its basal joint almost glabrous, comprising two-thirds or more its bulk; eyes small, convex, coarsely granulated; front coxæ separated by only about one-fourth their own width; tarsi short, feebly dilated, third joint slightly bilobed; abdomen apparently with but four ventral segments, the suture between first and second visible only under a strong lens. (*W. S. B.*)

858 (——). LIOLEPTA STENOSOMA sp. nov.

Slender, subcylindrical, feebly depressed. Reddish-brown, shining, minutely alutaceous, antennæ and tarsi paler. Beak and head very finely and sparsely punctate. Thorax subcylindrical, one-fourth longer than wide, hind angles rounded, sides straight and very slightly converging from base to apex; disc minutely and sparsely punctate. Elytra one-fourth wider and more than twice as long as thorax, sides parallel from base to apical fourth, then broadly rounded to apex; disc with only a shallow sutural stria evident, the others represented by unimpressed rows of very small punctures, separated by their own diameters. Under surface almost impunctate. Length 1.8—2 mm. (*W. S. B.*)

Lake Okeechobee Fla., March 8; two specimens beaten from bunches of Spanish moss. Dunedin, Fla., Jan. 24, one from beneath log on beach of bay. The slender form, extremely short beak and feeble sculpture distinguish this from all others before described. Resembles somewhat *Stenomimus pallidus*, but beak only one-fourth as long and front coxæ almost contiguous.

Subfamily XIII. CALANDRINÆ.

THE BILL-BUGS AND GRAIN WEEVILS.

A rather small group of usually large robust species, having the antennæ elbowed, inserted near the base of beak, their grooves very short, not receiving the scape; funicle 6-jointed, club not annulated, shining (Fig. 16); labrum wanting; mouth cavity elongate, peduncle of mentum narrow, elongate, concealing the oral organs; mandibles compressed, with three apical teeth; beak variable in length and sculpture; thorax truncate in front and beneath, without ocular lobes; elytra without epipleuræ and with a strong fold on inner face; abdomen with five ventral segments, the first and second longer, third and fourth short, their sutures straight and deeply impressed, fifth equal to third and fourth united, rounded behind, lateral edges of all the segments sharp, fitting into the groove of the under side of elytra; last spiracle covered by the ventral segments; pygidium large, nearly perpendicular, exposed in both sexes; last dorsal of male quadrate and more or less retracted or concealed; coxæ all more or less separated, the hind ones transverse, oval; femora usually strongly clavate, not toothed; tibiæ short, not serrate, clawed at the outer angle; tarsi rarely brush-like beneath, third joint rarely bilobed; claws divergent, simple.

The larvæ of the larger species bore into the stems of plants, especially grass and corn, while those of the smaller ones infest seeds and grain.

The subfamilies Calandrinæ and Cossoninæ were combined and treated as one family, Calandridæ, by LeConte & Horn. By more recent European writers they have been separated and placed as subfamilies of Curculionidæ, which course we here follow. The principal literature treating of the North American species is as follows:

Horn, Geo. H.—"Contributions to a Knowledge of the Curculionidæ of the U. S.," *in* Proc. Am. Phil. Soc., XIII, 1873, 407—447.

LeConte, J. L.—"The Rhynchophora of North America—Calandridæ," *in* Proc. Am. Phil. Soc., XV, 1876, 328—341.

Forbes, S. A.—"The Corn Bill Bugs," *in* Reps. on Nox. & Benif. Ins., Ill., XVI, 1890, 58—74, Pls. I—III; XXII, 1903, 1—26; XXIII, 1905, 52—57, Pl. II, figs. 27—34.

Chittenden, F. H.—"New Species of Sphenophorus," etc., three papers, *in* Proc. Ent. Soc. Wash., VI, 1904, 127—137; VII, 1905, 50—64; 166—182.

Many other articles treating of the economic phases of the beetles have appeared, a list of those up to 1900 being given by Forbes. (1890 and 1903.) Four of the eight genera of the subfamily are represented with us.

KEY TO EASTERN GENERA OF SUBFAMILY CALANDRINÆ.

a. Side pieces of metathorax very wide; epimera large; size very large, 20 or more mm. I. RHYNCHOPHORUS.

aa. Side pieces of metathorax moderate or narrowed; smaller, not over 17 mm. in length.

b. Club of antennæ wedge-shaped; epimera of mesothorax broadly truncate on the outer side; length 5 mm. or more.

c. Third joint of tarsi broad, spongy beneath, the brush narrowly divided. II. RHODOBÆNUS.

cc. Third joint of tarsi glabrous at middle, spongy or pilose at the sides or wholly glabrous. III. SPHENOPHORUS.

bb. Club of antennæ oval; epimera of mesothorax acute on outer side; length less than 4.2 mm. IV. CALANDRA.

I. RHYNCHOPHORUS Herbst, 1795. (Gr., "snout"+"to bear.")

The typical genus of and giving name to the suborder, *Rhynchophora,* comprising very large species, mostly tropical in distribution, having the mandibles of the usual pincer-form with

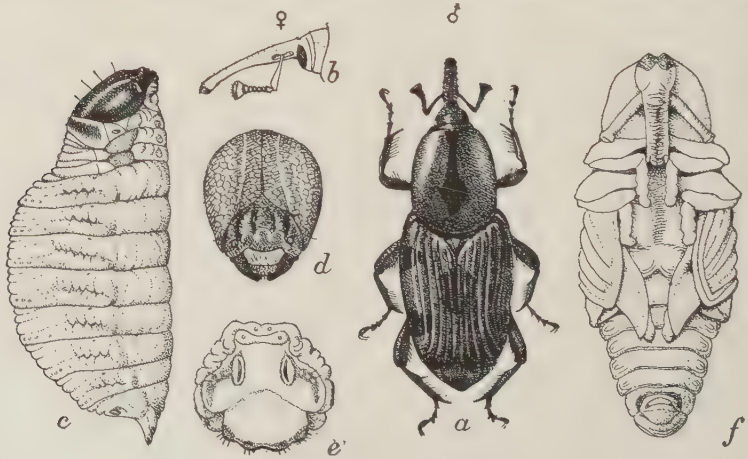

Fig. 118. Palmetto weevil. *a,* Male × 1½; *b,* head, beak and antenna of female from side; *c,* larva; *d,* head of same; *e,* last ventral segment of larva seen from above; *f,* pupa. (After Chittenden.)

three small apical teeth; funicle of antennæ consisting of six perfoliate joints, each strongly constricted at the outer end, club

or terminal joint much longer, transverse, corneous, its front face flat, spongy and sensitive; front coxæ narrowly separated.

859 (8971). Rhynchophorus cruentatus Fab., 1775, 128.

Elongate-oval, robust, depressed above. Black, shining. Thorax usually red, the sides broadly margined with black and disc with a median black stripe; elytra black with red spots; body beneath piceous, antennæ, legs and abdomen paler. Beak shorter than thorax, slender, cylindrical, granulated above, male; somewhat longer, more slender and smooth, female. Thorax oval, longer than wide, base obtusely rounded, sides feebly curved, disc smooth, impunctate. Elytra one-fourth wider than thorax; striæ deep, not punctured; intervals feebly convex, smooth. Legs fringed within with long yellowish hairs. Length 20—31 mm. (Fig. 118.)

Sarasota and Dunedin, Fla., Feb. 20—June 4. Occurs from South Carolina to Louisiana. Common in Florida where it lives on the cabbage palmetto, *Sabal palmetto* R. & S., and date palms, breeding in the dying trunks. Before pupating the larva forms an excavation in which it constructs a cocoon from an inch and a half to two inches in length, composed of fibre cemented with a glutinous secretion. (*Hamilton.*) Chittenden (1902-b, 25) states that the adults are very fond of the terminal bud after it is bruised, when it gives off a vinous odor, and also of the sap which exudes from recently felled or wounded trees. The larvæ bore in the soft, pulpy substance in the trunk and also in the roots. They are quite active, capable of traveling some little distance, and are noisy when at work, "making a sound like the escape of water with an occasional screech like a choked hen." Many specimens are wholly black, var. *zimmermanni* Fahr., but they do not differ structurally and are only a color variety.

Dr. R. E. Kunze (Ent. Materia Medica, p. 7) states that the larva of this species is called "grougrou" in the West Indies, where it furnishes an epicurean morsel when roasted and fried and has moreover the singular property of producing milk in women. A similar species is used by Tuscan peasants as a charm for toothache, by the simple process of crushing the larvæ between the fingers until the latter have absorbed sufficient oil with which to anoint the tooth.

Rhynchophorus palmarum Linn., a tropical American species, is listed by Henshaw from the United States, but we are unable to find a record of its occurrence.

II. Rhodobænus Lec., 1876.

Species usually red with black spots, distinguished by characters given in key and by having the scape long, reaching nearly to

middle of thorax; beak strongly swollen above the insertion of antennæ; thorax without raised spaces as in most *Sphenophorus*; mesosternum narrower than in allied genera; second joint of tarsi densely hairy beneath like the third. The two known species occur with us.

860 (8978). RHODOBÆNUS TREDECIMPUNCTATUS Ill., Schneid. Mag., V, 1791, 613.

Elongate-oval. Body beneath black; above red with black spots, five on thorax, the median one fusiform, and four on each elytron; the elytral spots often more or less confluent, specimens sometimes occurring with the entire surface black, margined at sides with red. Beak black, two-thirds as long as thorax, sparsely and finely punctate, coarsely so behind the antennæ. Club oval, its apical half convex, hairy and sensitive. Thorax longer than wide, feebly constricted near apex; sides in front distinctly curved, behind subparallel; disc finely and sparsely punctate. Elytral striæ fine, with small, remote punctures; intervals flat, smooth. Length 7—10 mm. (Fig. 119.)

Fig. 119. *a*, Beetle × 2; *b*, side view of same. (After LeBaron.)

Common throughout Indiana; April 17—Oct. 6; taken especially in the axils of the leaves of ironweed (*Vernonia*), in the stems of which it is said to breed. Throughout New Jersey in July. Occurs over the entire United States. Known as the "cockle-bur bill-bug," as it often breeds in the stems not only of that vile weed, *Xanthium commune* Brit. and other species of *Xanthium*, but also in those of many other Compositæ, as joe-pye weed, leaf-cup, sunflower, thistle, greater ragweed and rosin-weed. Hibernates in the adult stage, the newly bred imagoes appearing in August and September.

Several varieties based on color alone have been described. The two best known are:

R. pulchellus Schön., in which the spots at the end of each elytron are enlarged and coalesce so as to cover the whole tip. (Fig. 119.) Common everywhere with the typical form and scarcely deserving a varietal name.

R. quinquepunctatus Say, elytra wholly black except a narrow reddish stripe along each side; central spot of thorax often united behind with the two basal lateral ones which are obliquely merged. This is a common form in the Southern States. Sanford and Titusville, Fla., April; not rare on a species of thistle.

861 (8979). RHODOBÆNUS PUSTULOSUS Gyll., Schön., 1837, 923.

Oblong-elliptical. Above brownish-red or piceous, thickly mottled with small round, grayish-white spots; beneath black with a dense yellow-

ish coating, thorax with three black stripes. Beak three-fourths the length of thorax, sparsely and finely punctate and grooved at base above. Thorax longer than wide, sides feebly curved, slightly constricted near apex; disc very sparsely and finely punctate. Elytra slightly narrowed toward apex, striæ very fine, remotely punctured; intervals flat, each with a single row of distant punctures. Body beneath sparsely punctate. Length 10—11 mm.

Recorded from St. Augustine, Fla. Schwarz (1889, 2) says that "the occurrence of this species at St. Augustine is of great interest, since it was previously known only from southern Arizona and New Mexico. It adds another instance of a curious geographical distribution, viz., the simultaneous occurrence of certain species in the extreme southwestern and southeastern parts of North America."

III. Sphenophorus Schön., 1838. (Gr., "wedge" + "to bear.")

Rather large, robust, usually elliptic-ovate species having the body glabrous, often covered with a clayey artificial coat so as to hide the sculpture, more rarely with a dense natural glabrous coating; antennæ inserted near base of beak, scape long, slender, funicle six-jointed; club wedge shaped, convex in front, the outer third or more sensitive (Fig. 16); beak shorter than thorax, rather slender, feebly curved, swollen at base; antennal grooves very short, fovea-like, located close to eyes; thorax longer than wide, its disc usually with elevated smooth lines or spaces; elytra usually wider than thorax, their tips separately broadly rounded, thus widely exposing the pygidium.

The corn bill-bugs (or "elephant bugs"), as the species of *Sphenophorus* are commonly called, pass the winter in the imago stage among dead leaves and rubbish, and lay eggs early in the following summer, beginning probably in May. The larvæ hatch in June, feed on the bulbous roots of grasses and grass-like plants, including corn, pass into the pupal stage in July, and begin to emerge as imagoes late in July, continuing into August and possibly for some time thereafter. The normal food plants are wild grasses, especially those with bulbous roots, and injury to crops of timothy and corn occurs mainly where swamp lands are broken up in spring and planted to corn the same year, or where from poor cultivation the bulb-root grasses are allowed to grow up again, or old timothy sod is plowed in spring and planted immediately to corn. The best remedy is plowing in fall before the time for insect hibernation to begin.*

*For literature pertaining to their economic phases see the papers by Forbes, loc. cit.; also Bulls. 79 and 95, Ill. Agr. Exp. Sta. and Bull. 95, Pts. II and IV, U. S. Bur. Entom.

About 65 forms of *Sphenophorus* have been described from the United States. Some of these are synonyms while others are to be regarded as varieties of the better known species. Those occurring in the Eastern States, 35 in number, are for convenience separated into four groups, these groups and the keys which follow being based mainly upon those of Horn and Chittenden in the papers cited.

KEY TO GROUPS OF EASTERN SPECIES OF SPHENOPHORUS.

a. Front tibæ with the outer apical angle prolonged, middle and hind tibiæ truncate; tarsi slender; length 6 mm. GROUP A, p. 552.

aa. Tibiæ all broadly rounded at outer apical angle.

b Third joint of all the tarsi rather broadly dilated and glabrous at middle. GROUP B, p. 552.

bb. Third joint of hind tarsi at most feebly dilated.

c. Third joint of front and middle tarsi feebly dilated and spongy-pubescent at the sides. GROUP C, p. 555.

cc. Third joint of front and middle tarsi not dilated, entirely glabrous beneath or simply pilose at the sides. GROUP D, p. 561.

GROUP A.

This group is represented in the Eastern United States by the single species:

862 (8983). SPHENOPHORUS INÆQUALIS Say, 1831, 23; ibid, I, 291.

Oval, robust. Black, upper surface usually with a dirty brownish artificial coating. Beak two-thirds as long as thorax, feebly compressed, finely and rather sparsely punctate, base feebly swollen, foveate and finely grooved above. Thorax large, oval, as long as wide, disc very coarsely punctate, usually with three to five elevated smooth spaces, the median one larger, rhomboidal, narrowed at each end into a line. Elytra at humeri as wide as thorax, then strongly narrowed to apex; striæ with very coarse, distant punctures; intervals flat, their sides undulating, closely and coarsely punctate. Length 5.8—6.2 mm.

Posey County, Ind., scarce; April 23—May 7. Van Cortland Park, Staten Island and other localities near New York City; October. Hopatcong and Shark River, N. J., May—August. Eustis, Dunedin and St. Petersburg, Fla., scarce; Jan. 20—Apr. 7. Ranges from New York to Florida and Texas, mostly in the coastwise states. Easily recognized by the short, wedge-shaped form, prolongation of the front tibiæ and coarse sculpture.

GROUP B.

This group is represented in the Eastern States by three species:

KEY TO EASTERN SPECIES OF GROUP B.

a. Body densely clothed with a natural glabrous coating; lateral raised vittæ of thorax without a branch near base. 863. ÆQUALIS.

aa. Body without natural coating except on alternate intervals of elytra; lateral vittæ with a branch extending toward base.

b. Third elytral interval only strongly elevated on basal half; color black; beak suddenly dilated and obliquely truncate at tip. 864. LATINASUS.

bb. Elytral intervals 1, 3, 5 and 7 elevated throughout their length; upper surface red and gray, the median vitta of thorax and sutural vitta of elytra only black; beak not as above. 865. STRIATIPENNIS.

863 (——). SPHENOPHORUS ÆQUALIS Gyll., Schön., 1838, 941.

Elongate-oval, very robust. Black, entirely covered with a natural glabrous coating, which varies in color from a pale clay-yellow to reddish-brown and leaden gray, the darker specimens always pale beneath. Beak three-fourths as long as thorax, strongly compressed, broader at tip and base, finely and sparsely punctate. Thorax oval, longer than wide, sides subparallel from base to apical third, then rounded to the feebly constricted apex; disc with three broad, nearly entire, feebly elevated vittæ, these minutely and very sparsely punctate, their intervals more coarsely and more closely punctate. Elytra broadest slightly behind the base, then gradually narrowed to apex; striæ fine, rather coarsely not closely punctate; alternate intervals wider, often darker, with fine scattered punctures; narrower intervals, each with a single row of somewhat coarser punctures. Male with metasternum, first and second ventral segments concave and villous at middle, and inner edge of femora and tibiæ strongly fimbriate with yellowish hairs. Length 11—17 mm. (Fig. 120.)

Fig. 120. Beetle, dorsal and side views; larva with injured corn plant. (After Forbes.)

Occurs probably throughout Indiana, but taken only in Lake, Porter, Marshall and Vigo counties; Feb. 6—July 28. Abundant in the drift along the shore of Lake Michigan. Those taken in winter were found in Vigo Co., near ponds, in little burrows in

the sand beneath logs and rubbish.* Staten Island, Rockaway Beach and Long Island, N. Y.; July. Various points in New Jersey, June—July. Ranges from the Atlantic states to Michigan and South Dakota. Abundant in the District of Columbia. Breeds in the bulbous roots of the dark green bulrush, *Scirpus atrovirens* Muhl. and the reed, *Phragmites phragmites* L., the adults feeding on the stems and buds and ovipositing in late June.** (*Webster.*) The name *ochreus* Lec. applies only to western specimens, being in part a synonym of *æqualis*. In Illinois, where it is known as the "clay-colored bill-bug" and "elephant bug," it has proven very injurious to lowland corn.

864 (8991). Sphenophorus latinasus Horn, 1873, 421.

Moderately elongate. Black, shining. Beak three-fifths as long as thorax, rather suddenly dilated and slightly obliquely truncate at tip, thus showing at the end an oval space above the mandibles, causing the mouth-parts to appear more inferior than usual. Thorax longer than wide, median vitta entire, broadest at apex, not dilated, but slightly narrower and elongate-fusiform to base. Elytral sculpture much as in *cariosus*, the punctures of the striæ opposite, regularly placed. Length 10 mm.

Described from Georgia. Known only from the type. "The third joint of the hind tarsi is fully as dilated as those of the front and middle ones, and is also spongy-pubescent at the sides." (*Horn.*)

865 (——). Sphenophorus striatipennis Chitt., 1906-a, 180.

Elongate-oval, slender. Upper surface red, the head, beak, median thoracic vitta and sutural intervals of elytra black; under surface red varied with black; legs red, knees black; interspaces of thorax and flat intervals of elytra with pale gray coating. Beak less curved than in *costipennis*, not suddenly recurved and compressed in apical fourth as there; its apex deeply concave in front. Thorax as in *costipennis*, the branch of lateral vittæ less distinct. Elytral striæ fine, their punctures closer than in *costipennis;* intervals as in that species. Femora, and especially the tibiæ, more fimbriate than there. Third joint of hind tarsi as wide as long, about twice as wide as first. Length 9.5—12.5 mm.

Lake and Laporte counties, Ind., along the shore of Lake Michigan; May 6—Sept. 15. Ranges from Indiana and Michigan to California; known also from Texas. Horn mentioned it without name as a variety of *costipennis*. "Quite closely related to *costipennis* but distinct by the more fimbriate tibiæ, much wider third joint of posterior tarsi and stronger punctuation of lower surface." (*Chittenden.*) A very handsome and easily identified species.

*See Psyche, VIII, 1896, 457. **Bull. 22, U. S. Bur. Entom. O. S., 52.

GROUP C.

This group comprises 10 rather large eastern species, all agreeing in having the beak curved, three-fourths to the same length as thorax, dilated and finely grooved at base; thorax usually with three distinct raised vittæ, the median one nearly entire, not forked in front, the lateral ones with an outer branch extending from near the middle nearly to the hind angles; elytral intervals usually unequal in width, varying in convexity; third joint of front and middle tarsi more or less dilated and pubescent along the sides.

KEY TO EASTERN SPECIES OF GROUP C.

a. Elytral intervals either flat or alternately elevated throughout their entire length; striæ rather finely punctured.

b. Thorax with three distinct raised vittæ or smooth lines.

c. Beak subcylindrical, slightly narrowed at extreme base; alternate elytral intervals elevated, convex, irregular and somewhat interrupted; thoracic vittæ unequal, the outer strongly sinuous; length 11—15 mm. 866. PERTINAX.

cc. Beak more or less compressed.

d. Beak moderately subequally compressed, the hind angles of its apex acute or subacute, scarcely produced; thoracic vittæ with curved or sinuous outline.

e. Odd elytral intervals convex, black and shining, the others mostly opaque gray; second abdominal segment of male with a short, transverse brush of brown setæ; length 10—12.5 mm. 867. SETIGER.

ee. All the elytral intervals flat or nearly evenly convex, uniform in color.

f. Elytra covered with natural, thick clay-yellow coating except humeri and elevated basal portions of first and third intervals; other intervals subequally and feebly convex; length 14 mm. 868. PENINSULARIS.

ff. Elytra, with natural thin subsericeous gray coating; all the intervals flat and of nearly equal width; length 11—14 mm. 869. ROBUSTUS.

dd. Beak strongly compressed at apical fourth and suddenly bent backward, the front face of its apex flat or slightly concave, the hind or lower angles obtuse; thoracic vittæ subparallel.

g. Thoracic vittæ strongly elevated, nearly straight; elytral intervals 1, 3, 5 and 7 elevated and rather broad throughout their length; first ventral of male not uniformly villous; length 7—12.5 mm. 870. COSTIPENNIS.

gg. Thoracic vittæ less elevated, sinuous; elytral intervals 1, 3, 5 and 7 with elevated portions narrower, that of 3 and 5 short and narrowed toward apex, of 7 still narrower, sometimes wanting; male with first and second ventrals uniformly sparsely villous, fifth with long hairs; length 10—12 mm. 871. VILLOSIVENTRIS.

bb. Lateral vittæ of thorax very indistinct or wholly wanting; median one not entire.

h. Body elongate-oval; length 10—15 mm.

i. Elytral intervals 1, 3, 5 and 7 elevated, the even ones flat, usually covered with a clayey coating; beak near apex broadly and deeply concave; length 10—15 mm. 872. MAIDIS.

ii. All the intervals flat; surface entirely opaque and velvety in lustre; length 11 mm. 873. VELUTINUS.

hh. Body fusiform; length 7.5 mm. 874. SOLTAUII.

aa. Third elytral interval strongly elevated at basal half; striæ coarsely punctate; median thoracic smooth space dilated, rhomboidal at middle; length 8—11 mm. 875 CARIOSUS.

866 (8987). SPHENOPHORUS PERTINAX Oliv., 1807, 83, 90.

Elongate-oval. Black or reddish-black, shining, the interspaces of thorax and flat alternate intervals of elytra covered with a dirty white coating. Beak as in key, three-fourths the length of thorax, finely and sparsely punctate, foveate and finely grooved above at base. Thorax longer than wide, the apex constricted; vittæ entire, the median one widest at middle, narrowed before and behind; lateral ones with edges sinuous, branched as described above; interspaces and sides of disc coarsely punctate. Elytra broadest at humeri, sides feebly converging to apical fourth, then more strongly to the rounded apex; striæ with rather coarse, regular punctures; the broader and more convex intervals somewhat interrupted, minutely and sparsely punctate. Length 11—15 mm. (Fig. 121.)

Fig. 121. Beetle, dorsal and side views. × 3. (After Forbes.)

Frequent throughout northern Indiana, especially so in the counties bordering on Lake Michigan and in sandy areas about ponds and lakes, where it occurs beneath drift and rubbish; Feb. 6—Nov. 8. Many localities near New York City; May—Aug. Throughout New Jersey, May and June, in swampy meadows and marshes along shore; breeding in roots of sweet flag or calamus, *Acorus calamus* L.; also in those of the cat-tail flag, *Typha latifolia* L. Ormond, Fla., on ocean beach, Apr. 6. Ranges from New England and Canada to Michigan and Utah, south to Florida. "Common and occasionally injurious to corn in many places." (*Chittenden.*) Of the 40 or more specimens from Indiana, Illinois and Florida at hand, most have the ground color more or less reddish in hue, and in not one of the males do we find "the metasternum

with tufts of long, sparse, fine hairs nearly covering each side of posterior half," as described by Chittenden, nor does Horn in his Synopsis mention this character.

867 (——). SPHENOPHORUS SETIGER Chitt., 1905-b, 55.

Similar to *pertinax*. Black with ash-gray or grayish-brown coating; elytra nearly opaque gray. Beak as described in key, three-fourths to four-fifths as long as thorax, finely and sparsely punctate. Even elytral intervals thickly coated, flat, except a narrow, more or less distinctly elevated, smooth, black median line which is attenuate and abbreviated at each end. Male with ventral concavity deep and broad; metasternum with a row of short brown setæ just within the lateral margin, a few minute setæ each side of the first abdominal segment, second with a transverse median brush of longer dark ochraceous hairs. Fossa of last ventral segment of variable depth, coarsely punctate. Length 10—12.5 mm.

Common on salt meadows near New York City. Ranges from Vermont to Illinois and Dakota, south to Texas. Not recognized among the Indiana material at hand.

868 (——). SPHENOPHORUS PENINSULARIS Chitt., 1905-b, 56.

Similar to *setiger* but more slender. Black, largely covered with a clay-colored natural coating. Beak as in *setiger*, five-sixths as long as thorax. Thoracic vittæ with curved or sinuous outlines, more widely separated than in *pertinax*, the basal third of the median one very narrow. Elytra coated as described in key, their striæ finely punctate. Length 14 mm.

Fig. 122. Beetle, dorsal and side views. × 3. (After Forbes.)

Jacksonville, Fla. Described from the female.

869 (8988). SPHENOPHORUS ROBUSTUS Horn, 1873, 419.

Similar to *pertinax* but more robust. Beak more curved, subequally compressed. Thorax as wide as long, the median vitta feebly dilated at middle, its hind portion usually broad, attaining the base; lateral vittæ much less sinuous on the inner side than in *pertinax*, gradually wider from apex to base, lateral branch feeble. Elytral striæ fine, distinctly and rather distantly punctured, the inner ones crenate on sides; intervals alternately with one and two rows of very fine punctures. Male ventral concavity feebly impressed, nearly as coarsely punctate as at the sides. Length 11—14 mm. (Fig. 122.)

Lake and Vigo Counties, Ind., scarce; Feb. 6—July 28; hibernating with *æqualis*

on the former date. A species of northern range recorded from Illinois, Michigan, Wisconsin, Minnesota to California. "Occurs with *pertinax* but less common." (*Horn.*) Easily known from other members of this group by all the intervals of elytra being flat and subequal in width.

870 (8989). SPHENOPHORUS COSTIPENNIS Horn, 1873, 420.

Form similar to *pertinax* but usually more slender. Color as there. Beak compressed as mentioned in key, three-fourths as long as thorax finely and sparsely punctate, deeply grooved above at base. Thorax slightly longer than wide, sides parallel on basal two-thirds, then curved to the strongly constricted apex; disc with intervals between vittæ and sides coarsely punctured. Elytral striæ with coarse, rather distant punctures; intervals as described in key, the broader elevated ones with two rows of minute punctures, the narrow ones with a single row of coarse punctures. First ventral of male with small dense tuft of brown setæ each side, sometimes much abraded. Length 7—12.5 mm.

Lake, Porter, Steuben and Marshall counties, Ind.; frequent along the beach of Lake Michigan; May 6—Aug. 6. Brooklyn, Rockaway, Flatbush and Staten Island, N. Y., March—June. Many points in New Jersey, April—Sept. Common in Northern States and Canada from the Atlantic to the Pacific, ranging farther north and northwest than any other species of the genus.

871 (——). SPHENOPHORUS VILLOSIVENTRIS Chitt., 1905-b, 58.

Form of *costipennis*. Black, the humeri, antennæ, tarsi and some portions of the under surface reddish-piceous. Male with all the ventral segments more or less impressed, 1, 2 and 5 feebly concave. Otherwise separated from *costipennis* by characters given in key. Length 10—12 mm.

Described from Buffalo, Ithaca and Long Island, N. Y.; Massachusetts, Maryland, District of Columbia and Ft. Monroe, Va. Known also from numerous localities in New Jersey; April—May. "To outward appearance this is merely *costipennis* with weakly elevated elytral intervals, but the hirsute abdomen of male is very like that of the *æqualis* group." (*Chittenden.*)

872 (——). SPHENOPHORUS MAIDIS Chitt., 1905-b, 59.

Oblong-oval, robust. Dark reddish or piceous-velvety, feebly shining; the clayey deposit on flat surfaces inconspicuous. Beak three-fifths the length of thorax, minutely punctate, strongly subequally compressed throughout, the front face of its apex deeply concave, hind or lower angles acutely produced. Thorax longer than wide, three-fourths as long as elytra, sides subparallel from base nearly to apical fourth, then strongly and suddenly curved and constricted at apex; vittæ feebly elevated, subobsolete, the outer ones frequently united with the middle one in its apical half,

the latter broadly dilated at middle, narrowing to a line at each end; interspaces and surface at sides coarsely punctured. Elytra slightly wider than thorax; striæ deep, well defined, distinctly and closely punctate; third interval widest and most elevated with four or five rows of fine punctures. Male with first abdominal segment very feebly concave, pygidium truncate at apex. Length 10—15 mm.

Described from Alabama, South Carolina, Kansas and Texas; reported also from Michigan by Knaus. Known as the "maize bill-bug," being in places very destructive to corn, in the base of the stalk of which the larvæ breed. The adults begin to mature in August and most of them hibernate in the pupal cell in the base of the corn stalk, issuing therefrom in late spring and attacking the young corn plants as soon as they reach the surface. Eggs are deposited in the base of the stalk, hatching in early June, the larva boring and eating its way until ready to pupate. The species breeds also in the root-stalks of the swamp or gama grass, *Tripsacum dactyloides* L., which was probably its original host plant.* Prior to the description by Chittenden, most of the damage done by this species was attributed to *S. robustus* or *S. pertinax*.

873 (8992). SPHENOPHORUS VELUTINUS Lec., 1876, 424.

"Elongate. Brownish-black, entirely opaque and velvety in lustre. Beak shorter than thorax, curved, somewhat compressed, smooth. Thorax more than one-half longer than wide, oval, strongly tubulate in front, its elevations very vague and ill defined, the impressions marked with shallow punctures; sides more densely and deeply punctured; dorsal median line narrow, slightly elevated, extending nearly to the base and apical constriction. Elytra not longer than thorax, narrowed behind from near the base; striæ very fine, marked with a few distant small punctures, the two outer ones with more numerous larger punctures; intervals flat, obsoletely punctulate; pygidium with a few large, deep punctures; under surface sparsely punctured; front and middle tarsi with the third joint broadly dilated, spongy each side beneath; third joint of hind tarsi slightly dilated, not wider than long. Length 11 mm." (*LeConte.*)

Described from one specimen from Florida; another in the Horn collection from Louisiana. A distinct and unique species, easily known by its velvet-like coat.

874 (——). SPHENOPHORUS SOLTAUII Chitt., 1906-a, 178.

Body subfusiform, half as wide as long. Black, subopaque, the elevated parts feebly shining, without trace of alutaceous coating. Beak three-fifths as long as thorax, feebly curved, distinctly compressed. Thorax longer than wide, disc coarsely, densely, unevenly punctured, with only the median vitta present, in the form of a narrow, smooth unelevated space. Elytral

*Kelly. "The Maize Bill-bug," Bull. 95, Pt. II, U. S. Bur. Ent.

striæ on basal half very deeply, coarsely and confluently punctate, becoming narrow toward apex; intervals irregularly alternate in width and convexity. Front and middle tibiæ with the outer angle feebly prolonged. Third joint of front and middle tarsi strongly dilated; of the posterior tarsi, feebly so. Length 7.5 mm.

Described from Pennsylvania, Illinois, Iowa, Colorado and Texas. "In the sand hills of Reno County, Kansas, which in dry seasons become intensely hot to the destruction of insect life, many dead specimens were found May 1, having apparently lit in swarms on the sand and been overcome by the heat before they could rise in flight, as many of them had their wings still protruded." (*Knaus.*) Resembles *zeæ* in form and general appearance.

875 (8990). SPHENOPHORUS CARIOSUS Oliv., 1807, 91.

Elongate-oval. Black, the elevated portions above and under surface shining. Beak three-fourths as long as thorax, strongly compressed along median portion, sparsely and finely punctate, more coarsely at base. Thorax about as broad as long, sides subparallel, male, feebly converging, female, from base to near the distinctly constricted apex; disc with three vittæ, the median beginning at apical constriction, dilated to a rhomboid near middle, then either ending abruptly or prolonged in a fine line toward base; outer ones broad, sinuous, entire, the lateral branch short, broad; vittæ minutely and sparsely punctate; their intervals and sides of disc coarsely punctate, covered with a thin dark gray coating, the sides with a small, smooth, coarsely punctate area behind the apical angle. Elytra at humeri slightly wider than thorax, then feebly curved and converging to apex; striæ fine, their punctures coarse, deep, distant; intervals flat, each with a single row of minute punctures; third strongly elevated on basal half, its elevated portion, the humeral callus and a small one near declivity, smooth, shining. Length 8—11 mm.

Fire Island, Jamaica and Long Island, N. Y.; May—July. Throughout New Jersey; May—September. Ormond, Fla., April 6. Recorded from New England and Canada to Illinois, south to Florida, but many of the records are based on wrong determinations and refer to *callosus* Oliv., which LeConte and Horn erroneously united with *cariosus*. The latter species occurs very rarely in the Northern States, and Horn was probably about correct when he gave its distribution as "Middle States, rarely; Gulf States, abundantly." Chittenden, who showed that *callosus* and *cariosus* were distinct, concluded that Uhler's *sculptilis* is a synonym of *cariosus*, and that the species usually known and figured as *sculptilis* is in reality *zeæ* Walsh. The above description of *cariosus* is from Florida specimens. As Horn well said before *callosus* was united with it, "it is one of the most easily

recognized species in our fauna." On account of the great confusion of names, it is impossible to decide from the records what the food plants of the species really are.

Group D.

This group comprises the eastern species having the third joint of all the tarsi slender, scarcely wider than first or second and either wholly glabrous or pilose along the edges beneath. The species are in many instances not closely related and in a natural classification several distinct groups are indicated, but in the present confused state of the nomenclature, they are placed in one key as follows:

KEY TO EASTERN SPECIES OF GROUP D.

a. Elytral intervals all flat, (rarely, *scoparius*, subequally feebly alternating,) no single one of them in part or wholly distinctly elevated above the others.

b. Beak curved, usually slender; front tibiæ straight.

c. Thorax punctured nearly equally over the entire surface, sometimes with a smooth median, not elevated line or space, but never with trace of lateral vittæ.

d. Femora coarsely foveate-punctate; surface with dense gray or velvety coating; thorax and elytra nearly equal in width.

e. Thorax broadest behind the middle, densely, regularly and rather finely punctate, median line absent or very narrow; length 5—6.5 mm. 876. PARVULUS.

ee. Thorax broadest in front of middle, sparsely, irregularly and very coarsely punctate, median line absent or short; length 5—6 mm. 877. MINIMUS.

dd. Femora sparsely and finely punctate; surface black without coating above.

f. Thorax distinctly narrower than elytra, densely, confluently, very irregularly and deeply punctate, median line narrow, irregular, often interrupted; length 4.8—6 mm. 878. MARINUS.

ff. Thorax large, not distinctly narrower than elytra.

g. Beak with an oval fovea on side in front of eye; thorax very coarsely and unevenly punctate and with large irregular median smooth space. 879. CHITTENDENI.

gg. Beak without fovea on side of base; thorax not exceedingly coarsely punctured.

h. Thorax with a median fusiform smooth space; length 8—10 mm. 880. RETUSUS.

hh. Thorax shining, unevenly, not coarsely punctate, and without median smooth space; elytra strongly narrowed at tip; length 7.5 mm. 881. GAGATINUS.

cc. Thorax with more or less distinct raised vittæ or smooth spaces.

i. Median thoracic vitta, when present, not forked in front.

j. Median vitta more or less dilated at middle.

k. Thoracic vittæ coarsely punctate; base of thorax strongly bisinuate; dilation near base of beak wide with sides subangulate, above deeply and broadly grooved and very coarsely punctate. 882. DESTRUCTOR.

kk. Thoracic vittæ finely or not at all punctate (except in var. *sublævis* of *callosus*).

l. Median vitta broadly dilated at middle; lateral vittæ often more or less interrupted or obscure in front of origin of branch.

m. Surface without artificial coating.

n. Hind tibiæ of male simple; elytral intervals flat, subequal; striæ with very coarse foveæ; dilation near base of beak subglabrous, not grooved and finely punctured above; length 7.5—9 mm. 883. ZEÆ.

nn. Hind tibiæ of male subangulate at middle, the angle with a dense brush of long hair; elytral intervals feebly alternating in width, the wider with two or three rows of punctures; striæ with coarse punctures; length 8—10.5 mm. 884. SCOPARIUS.

mm. Surface densely coated; lateral vittæ indistinctly limited, the median not extending behind the middle, the basal interspace of thorax with very coarse punctures; length 8.5—13 mm. 885. CALLOSUS.

ll. Median vitta reduced to a slender apical carina, slightly dilated at middle of thorax; lateral vittæ without outer branch; surface with clayey coating; length 7.5—10 mm. 886. MELANOCEPHALUS.

jj. Median vitta not or feebly dilated at middle.

o. Lateral vittæ present, sometimes abbreviated.

p. Median vitta fusiform; lateral vittæ short, usually represented by an oblique line on basal half; base of beak strongly swollen, coarsely punctate; color piceous or reddish, the suture black; length 6.5—7 mm. 887. SAYI.

pp. Median vitta narrow; lateral vittæ entire; base of beak feebly swollen, finely and sparsely punctate; length 8.5—9 mm. 888. SUBCARINATUS.

oo. Lateral vittæ absent; median vitta narrow, represented by a dorsal line extending to apex, where there is a large oblong fovea each side of it; length 7 mm. 889. APICALIS.

ii. Median vitta forked in front, enclosing a slight fossa immediately behind the apical constriction.

q. Body naked; beak four-fifths as long as thorax, cylindrical; length 9—11 mm. 890. PONTEDERIÆ.

qq. Body with more or less dense clayey coating; beak shorter, distinctly and uniformly compressed.

r. Thoracic vittæ and apical fossa well defined.

s. Coating scant and easily abraded, not covering lower surface or sides; lower surface finely and sparsely punctate; length 6—10 mm. 891. VENATUS.

ss. Coating thin, velvety, covering most of the body; lower surface coarsely punctate; length 9—10 mm. 892. VESTITUS.

rr. Thoracic vittæ usually feebly developed; color reddish, the surface coating moderately dense, gray or red, thin or velvety; length 7.5—9.5 mm. 893. RETICULATICOLLIS.

bb. Beak not curved, strongly compressed; front tibiæ strongly angulate at middle, armed with two spurs, the sub-apical one rather long. 894. GERMARI.

aa. Elytral intervals 1, 3 and 5 either wholly or in part elevated above the others.

t. Vittæ of thorax distinctly elevated, narrow, polished black; beak with front face of apex flat, the posterior face suddenly bent forward; elytral intervals 1, 3 and 5 feebly elevated in basal half or more; length 9—11 mm. 895. INCONGRUUS.

tt. Vittæ of thorax feebly elevated, rather coarsely and densely punctate; front face of apex of beak concave, its posterior face obtuse; elytral interval 1 strongly elevated, 3 and sometimes 5 feebly elevated and black near apex; length 10—11.5 mm. 896. ROBUSTIOR.

876 (9000). SPHENOPHORUS PARVULUS Gyll., Schön., 1838, 961.

Elongate-oval. Black with ash-gray clayey coating; antennæ, except the club and tarsi reddish-brown. Beak three-fourths as long as thorax, coarsely and sparsely punctate, its base thickened and above rather deeply grooved. Thorax about as long as wide, at middle slightly wider than elytra, sides strongly curved in front of middle, apex strongly constricted; disc sculptured as given in key. Elytra finely striate, striæ with rather distant very coarse punctures; alternate intervals slightly wider and somewhat elevated, the first and third with two, the others with a single row of rather coarse punctures. Length 5—6.5 mm. (Fig. 123.)

Fig. 123. × 5. (After Forbes.)

Lake, Putnam and Vigo counties, Ind., scarce; May 25—Oct. 20. Numerous localities near New York City; April—September. Throughout New Jersey; May—July. Ranges from New England to Michigan and Nebraska, south to Florida and Texas. Breeds in roots of blue-grass, *Poa pratensis* L. and timothy, *Phleum pratense* L., and known as the "blue-grass bill-bug." Occurs as adult in Illinois from March 18 to October, and is essentially an upland species; sometimes abundant in city lawns, doing much damage to timothy meadows and also to corn planted in old meadows. Hibernating as imago, the eggs are deposited in May, the larvæ appearing in June, pupating in late July, the adults emerging in August and September.

(*Forbes.*) Bruner states that in Nebraska it is two-brooded, the larvæ being found in June and again in September. Remedy, fall plowing of infested timothy fields.

877 (11,215). SPHENOPHORUS MINIMUS Hart, 16th Rep. Ill. State Ent., 1890, 65.

Black, opaque when denuded, covered with a thin ash-gray or clay-yellow coating; tarsi and funicle reddish-brown. Beak two-thirds as long as thorax, naked in front of antennæ, dilated, finely punctate, and shallowly grooved above at base. Thorax longer than wide, as wide at middle as elytra, sides nearly straight, disc with very coarse variolate punctures sparsely and irregularly placed, sometimes a short, oblong tubercle near middle, occasionally extending backward as an obsolete raised line. Elytra widest at humeri, narrowing strongly to apex, surface uneven; striæ with very coarse variolate punctures forming irregular transverse rows; intervals flat, uneven, especially the basal halves of sixth and seventh, each with a row of fine punctures; subapical callus distinct. Length 5—7 mm. (Fig. 124.)

Fig. 124. × 6. (After Forbes.)

Frequent in southern half of Indiana, scarce northward; March 25—Oct. 18. Atlantic City and Anglesea, N. J. Dunedin, Fla., Jan. 16—March 25. Ranges from New York to Illinois, south to Florida and Texas. Occurs in low swampy places, the types having been taken from floating driftwood and logs near water. Nothing is recorded of its host plants.

878 (——). SPHENOPHORUS MARINUS Chitt., 1906-a, 166.

Elongate-oval. Black, opaque, antennæ, tarsi and lateral margin of elytra piceous. Beak two-thirds as long as thorax, stout, coarsely punctate at base, more finely and sparsely so toward tip. Thorax slightly longer than wide, sides nearly parallel on basal two-thirds; disc punctured as given in key. Elytral striæ fine, coarsely punctate on basal half; intervals flat, subequal, the third widest, their punctures fine, irregular. Male pygidium wide and subtruncate at apex, with fringe of yellow hairs nearly uniform; ventral concavity distinct, shallow. Length 4.8—6 mm.

Sea Isle City, Westville and Atlantic City, N. J., June 10. On cranberry bogs. (*Smith.*) "Maritime and probably local. Belongs near *parrulus* and *minimus*. The coarse, subconfluent thoracic sculpture is alone sufficient for its separation, but the elevated median line of thorax, large concave scutellum and prominent subapical callosities of elytra are also important characters." (*Chittenden.*)

879 (——). SPHENOPHORUS CHITTENDENI sp. nov.

Oval, robust. Black, feebly shining, head, beak and legs more strongly so; antennæ and tarsi piceous; all the sterna, coxæ and inner faces of femora with a thick dirty yellow coating. Beak scarcely more than half the length of thorax, strongly compressed, distinctly but rather feebly enlarged at apex, finely and sparsely punctate, its base not constricted behind the antennæ, but continuous with head; above deeply grooved and with a large oval fovea between the groove and base of scape. Thorax very large, widest just in front of middle where it is slightly wider than elytra, sides feebly diverging from base to beyond middle, then gradually curved to the constricted apex; disc without vittæ but with a large irregular smooth space at middle, elsewhere very coarsely, sparsely and unevenly cribrately punctured. Scutellum elongate-triangular, not concave. Elytra only one-fifth longer than thorax, widest at base, the sides then strongly converging to the obtuse apex; striæ narrow, very coarsely and remotely punctate; intervals apparently undulating on account of the large strial punctures, the third slightly wider and a little more elevated than the others, each with a single row of minute remote punctures, those of the sutural interval much closer. Under surface coarsely and sparsely punctate. Legs almost smooth; tarsal joints all slender. Length 8.2—11 mm. (*W. S. B.*)

Dunedin, Fla., Jan. 16—March 25. Two specimens from beneath boards on border of inland pond and one beneath seaweed on Gulf beach. Allied to *retusus*, but differing by the stouter beak, larger thorax with very much coarser and more uneven punctures, and much finer punctures of elytral intervals. Named for Dr. F. H. Chittenden, of the U. S. Bureau of Entomology, who has shown us many favors during the preparation of the present work. One specimen of *chittendeni* without locality is in the LeConte collection, labelled *"retusus,"* and one from Florida, is among the specimens of *retusus* in the Horn collection.

880 (9002). SPHENOPHORUS RETUSUS Gyll., Schön., 1838, 549.

Oval, robust. Black, subopaque; elytra often with a reddish tinge; antennæ, tibiæ and tarsi reddish-brown. Beak half the length of thorax, very finely and sparsely punctate, strongly compressed on median third, then gradually feebly widening to apex, which is flat or broadly concave above; the base strongly grooved above. Thorax slightly longer than wide, feebly constricted at apex, disc rather coarsely, closely and evenly punctate and with a fusiform median smooth space, not reaching base or apex. Elytra oval, scarcely longer than head and thorax, gradually attenuate to tip; striæ with moderately coarse punctures on basal half, finer toward apex; intervals equal, slightly irregular, each with a row of rather coarse, remote punctures, those of the third somewhat confused. Undersurface coarsely and sparsely punctate. Length 8—10 mm.

Rockaway Beach and Fire Island, N. Y.; July—September. Throughout New Jersey, not common; April—September. Ranges from Massachusetts to Florida in the coastwise states.

881 (9004). SPHENOPHORUS GAGATINUS Gyll., Schön., 1838, 952.

Black, shining. Beak three-fourths the length of thorax, feebly compressed, minutely punctate and finely grooved at base. Thorax longer than wide, unequally punctured, sparsely and finely over the greater part of surface, more coarsely and densely along the base; from the latter coarse punctures extend forward each side of median line. Elytra oval, scarcely longer than head and thorax, striate with coarse punctures gradually evanescent toward apex; intervals flat, equal, finely punctulate. Under surface coarsely and closely punctured. Length 7.5 mm.

New Jersey without definite locality. Georgia. "Easily known by the shining thorax and rapidly narrowed elytra." (*Horn.*)

882 (——). SPHENOPHORUS DESTRUCTOR Chitt., 1906-a, 174.

Form and size of *zeæ*. Black, thickly covered with dull clay-colored or brownish artificial coating. Beak three-fourths as long as thorax, compressed in apical two-thirds, finely and sparsely punctate. Thorax slightly longer than wide, sides subparallel from base to middle, then curved and converging to the moderately constricted apex; base strongly bisinuate; disc with three more or less irregular, sometimes partly obsolete, coarsely punctured vittæ, the median one usually fusiform at middle and prolonged in a narrow line at each end, the lateral ones narrower, strongly sinuate; interspaces and sides of disc coarsely and sparsely punctate, the latter with a large shallow cavity near apex and a similar deeper one near base, which is usually enclosed by the branch of the lateral vitta and base of the vitta itself. Elytral sculpture much as in *zeæ*, the coarse punctures of the striæ so confluent near base as to form three or four oblong fossæ between the alternate intervals. Under surface coarsely and sparsely punctate. Length 7—9.5 mm.

Posey County, Ind., scarce; May 9—May 12. Described from Anglesea, N. J., Missouri, Kansas, Oklahoma and Texas. Reported as often injurious to corn and chufa, *Cyperus esculentus* L. This species and the var. *sublævis* of *callosus* form, in a way, connecting links between *zeæ* and *callosus*, and time may show that all are one species. From *zeæ*, which it closely resembles superficially, *destructor* is easily separated by the characters given in key, and fossæ of thorax and elytra.

883 (——). SPHENOPHORUS ZEÆ Walsh, Practical Ent., II, 1867, 117.

Elongate-oval. Black or reddish-brown, shining. Beak three-fourths the length of thorax, compressed at middle, finely and sparsely punctate, more coarsely above the swollen base. Thorax with three elevated vittæ, the median one nearly entire, very slender at each end, broadly dilated in front of middle; lateral vittæ sinuous, broadly interrupted in front of branch, spaces between and sides of thorax coarsely and densely punctured. Elytra with flat, nearly equal intervals, each with a row of fine

Fig. 125. Beetle, dorsal and side views. × 4. (After Forbes.)

but distinct punctures, the alternate ones almost interrupted by the coarse strial punctures. Pygidium coarsely and deeply punctured, with an oblique line of short yellowish hairs each side. Length 7.5—9 mm. (Fig. 125.)

Common in the northern third of Indiana, much less so in the southern counties; Feb. 6—Sept. 30. Hibernates beneath rubbish near water. Long and Staten Islands, Peekskill, West Point and Bronx, N. Y.; April—July. Watch Hill, R. I., June 18—July 11. Throughout New Jersey; May—July. Ormond, Sanford and Dunedin, Fla.; Jan. 15—April 6. Ranges from New England to Michigan and Kansas, south to Florida. Usually listed as *sculptilis* Uhler, which name is a synonym of *cariosus*. Known as the "timothy bill-bug," as it often breeds in the roots of timothy and attacks corn on timothy sod. A liberal application of stable manure, tobacco dust, lime or other suitable fertilizer immediately after hay harvest is recommended (*Hopkins*); fall plowing (*Smith*).

884 (8994). SPHENOPHORUS SCOPARIUS Horn, 1873, 424.

Similar to *zeæ* but more robust. Beak more swollen and more coarsely punctate above at base. Thoracic vittæ subobsolete, finely and sparsely punctate, the interspaces and sides of disc coarsely and closely punctured. Elytra finely striate, the striæ with coarse punctures on basal half, becoming finer toward apex; intervals as in key. Pygidium coarsely punctured and with a slight tuft of hairs each side at apex. Body beneath coarsely punctured. Length 8—10.5 mm.

Described from two specimens from Wisconsin and Kansas. Recorded by Hart from Illinois. In Horn collection from Nebraska.

885 (——). SPHENOPHORUS CALLOSUS Oliv., 1807, 92.

Oval, robust. Black, densely clothed with a brownish or olivaceous clayey coating; antennæ and tarsi reddish-brown. Beak two-thirds the length of thorax, compressed and sparsely punctate except near base, where it is swollen, coarsely punctate and shallowly grooved above. Thorax slightly longer than wide, sides parallel from base for three-fourths their length, then strongly rounded to the constricted apex; disc very coarsely and irregularly punctate, the median vitta usually broadly

dilated at middle, its apical portion very narrow; lateral vittæ broad at base and with a short oblique branch, their front portion often replaced by coarse punctures. Elytra oval, their surface uneven, sides gradually narrowed from humeri to apex; striæ fine, coarsely and distantly punctate; intervals flat, their punctures hidden, the third sometimes feebly elevated at base. Humeral umbone and subapical callus somewhat prominent, often shining. Under surface coarsely and sparsely punctate. Length 8—12 mm. (Fig. 126.)

Fig. 126. × 4. (After Forbes.)

Lake, Putnam, Blackford, Vigo, Perry and Posey counties, Ind., scarce; probably throughout the state; May 1—July 14. Jamesburg, N. J.; July. Ormond and Sarasota, Fla.; March 5—April 6. Ranges from Maine to Wisconsin and Kansas, south and southwest to Florida, Texas and Arizona. Known especially in the Southern States as the "curlew bug," and in certain localities doing much injury to corn and rice. The natural host plants are chufa or yellow-nut grass, *Cyperus esculentus* L.; witch-grass or tumble weed, *Panicum capillare* L. and Frank's sedge, *Carex frankii* Kunth. The two best measures of prevention of damage by the insect are extermination of these natural food plants from the fields, and rotation of crops. (*Webster*, 1912.) Most economic literature pertaining to *S. cariosus* Oliv. is to be referred to this species. *S. sculptilis* Horn (nec Uhler) is a synonym.

885-a (——). SPHENOPHONUS CALLOSUS SUBLÆVIS Chitt., 1906-a, 176.

Similar in form to *callosus*. Outer artificial coating less dense, sometimes nearly wanting. Vittæ of thorax less elevated, very coarsely and sparsely punctate throughout their extent. Sculpture of elytra more distinct, the strial punctures very large, those of the intervals coarser, confused on the broader third and fifth intervals. Subapical tibial spurs better developed, those of the front pair being half as long and nearly as thick as the apical ones. Length 7.5—10 mm.

Lake and Vigo counties, Ind., scarce; May 20—July 19. Whitehall, Mich, July 27. Described from Indiana, Illinois, Wisconsin and Missouri. Except in the minor characters above set forth, this cannot be distinguished from *callosus* and we regard it only as a variety of that species.

886 (8995). SPHENOPHORUS MELANOCEPHALUS Fab., 1801, II, 435.

Elongate-oval, robust. Black or piceous, densely clothed above with a brownish, velvety, artificial clayey coating. Beak two-thirds the length of thorax, strongly compressed, finely and sparsely punctate in front of antennæ; suddenly swollen, coarsely and densely punctate and feebly grooved above at base. Thorax as wide as long, median vitta represented by a short apical shining carina, slightly dilated behind; lateral ones usually absent, sometimes represented by an indistinct line; disc coarsely, rather sparsely and irregularly punctate, each side with a small round shining callosity near front angles. Elytra oval, gradually narrowed behind; striæ fine, with rather coarse remote punctures; intervals flat, finely punctate, the third wider; humeral umbone, subapical callus and scutellum shining. Under surface shining, coarsely and sparsely punctate. Length 7—10.5 mm. (Fig. 127.)

Fig. 127. Beetle, dorsal and side views. × 4. (After Forbes.)

Frequent throughout northern Indiana, scarce in the southern counties; Feb. 6—Oct. 9. Taken most commonly from bare sandy areas near ponds and lakes; hibernates beneath logs and rubbish in such places. Rockaway Beach, Brooklyn and Staten Island, N. Y.; April—July. Numerous localities in New Jersey, May—July. Ranges from New England to Michigan and Kansas, south to Georgia. Nothing distinctive of its food habits is known.

887 (8996). SPHENOPHORUS SAYI Gyll., Schön., 1838, 943.

Elongate-oval, slender. Piceous or often reddish with head, beak, thoracic vittæ and sutural intervals black, shining; beneath piceous and reddish. Beak slender, three-fourths the length of thorax, feebly compressed, swollen and sparsely punctate above the antennæ, strongly constricted at base. Thorax longer than wide, surface between and on sides of vittæ rather coarsely, not densely punctate; lateral vittæ slender, often obsolete on apical third, when entire curved outward at middle, coarsely punctate; median one abbreviated in front, feebly dilated at middle, then narrowly prolonged toward base. Elytral striæ rather finely punctate; intervals feebly alternating, the odd ones slightly the more convex, minutely punctate. Under surface rather finely and sparsely punctate. Length 6.5—7 mm.

Lake Co., Ind., scarce in the drift along the beach of Lake Michigan; May 7—June 16. Anglesea, N. J.; July. Ranges from New Jersey to Illinois, south to Georgia.

888 (——). Sphenophorus subcarinatus Mann., 1843, 294.

Elongate-oval, slender. Black, feebly shining, often dull red with head, beak except at base, vittæ of thorax and greater part of under surface black. Beak slender, four-fifths the length of thorax, strongly compressed, alutaceous, finely and sparsely punctate, very feebly swollen and grooved above at base. Thorax nearly twice as long as wide at base; sides sinuate, almost parallel from base to middle, then curved outward, then feebly converging to the slightly constricted apex; disc with three almost entire narrow vittæ, the median subequal in width throughout and slightly wider than the outer ones, the branch of the latter very feeble; interspaces and sides of disc coarsely, unevenly and sparsely punctate. Elytral striæ very fine, their punctures rather coarse, separated by twice their own diameters; alternate intervals slightly wider and feebly elevated, each with a row of minute punctures, those of the third confused. Under surface rather finely and sparsely punctate. Ventral impression of male narrow, deep, very coarsely and sparsely punctate. Length 8.5—9 mm.

Lake Co., Ind., rare; May 30. California and Aleutian Islands. Longer and more slender than *sayi*, the beak longer, more compressed, with base much less swollen and more finely punctate; thorax proportionally longer, sides sinuate and vittæ entire. Horn placed *subcarinatus* as a synonym of *sayi*, but Chittenden considers them distinct.

889 (8997). Sphenophorus apicalis Lec., 1878, 432.

"Elongate, black, not shining. Thorax with a narrow dorsal elevated line extending to apex, where there is a large, oblong fovea on each side of it; discoidal elevations not apparent; punctures very large, shallow, irregularly scattered. Elytra with fine striæ, upon which are placed large, distant, rounded punctures; alternate intervals slightly more convex near base, which is deeply bi-foveate or tri-foveate each side; proximal third of beak deeply and broadly excavated; third joint of all the tarsi narrow, not spongy beneath. Length 7 mm." (*Horn.*)

Gloucester and Avalon, N. J.; April 24—June 23. Lake Worth, Fla. The type was found on the beach at Tampa, Fla., in May.

890 (——). Sphenophorus pontederiæ Chitt., 1905-b, 63.

Elongate-oval. Dull black without surface coating. Beak four-fifths as long as thorax, cylindrical, finely and sparsely punctate; base moderately swollen, coarsely punctate, narrowly grooved above. Thorax longer than wide, sides and median basal area coarsely, partly confluently, punctate; vittæ very broad, shining, feebly elevated, the lateral ones united with the median near middle, the latter divided at apex. Elytral striæ coarsely and rather closely punctate; intervals flat, somewhat irregular in width, the third widest, sixth and eighth very narrow, all with a single row of minute punctures. Under surface coarsely and densely punctate. Length 9—11 mm.

Gloucester, N. J., May 27. Sarasota and Utopia, Fla., March 2—5; frequent beneath decaying plant stems in recently drained ponds. Recorded elsewhere from Louisiana, Georgia, Texas and St. Lucie, Fla. Reared by Koebele from roots of pickerel weed, *Pontederia cordata* L. Distinguished from *venatus* (*placidus*) by its naked body, long cylindrical beak, longer legs and broader thoracic vittæ. (*Chittenden.*) The subapical fossa of thorax is divided in only one of eight specimens at hand. In two the fossa itself is represented only by two short rows of punctures.

891 (8998). SPHENOPHORUS VENATUS Say, 1831, 22; ibid, I, 290.

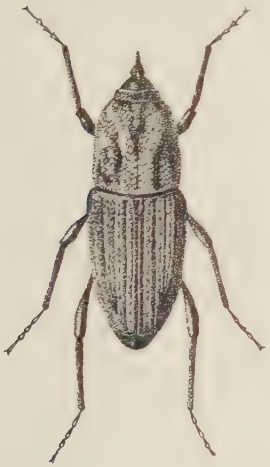

Fig. 128. × 5. (After Forbes.)

Elongate-oval, comparatively slender. Black or reddish-piceous, feebly shining. Beak three-fourths as long as thorax, sparsely and finely punctate, more coarsely and distinctly grooved above at base. Thorax slightly longer than wide, feebly constricted near apex; disc coarsely and irregularly punctate; median vitta dilated behind the apical fossa, then narrowed and prolonged backwards toward base; lateral vittæ usually joining the median in front, their oblique branch feeble or wanting. Elytra oval, evenly narrowed from base to apex; striæ fine, coarsely punctured; intervals flat, slightly alternating in width and elevation, the narrower ones with very fine widely remote punctures, the wider with a single row of rather close ones which are slightly confused on the third. Length 6—10 mm. (Fig. 128.)

Throughout Indiana but scarce; March 12—July 19. Occurs beneath rubbish in sandy localities near water. Various localities near New York City; April—August. Common along the seashore of New Jersey; May—July. Dunedin and Sarasota, Fla.; Feb. 14—18; taken beneath seaweed on the Gulf beach. Ranges from Maine to Wisconsin, south to Florida and Texas. Easily known among our northern species by the forked or Y-shaped median vitta of thorax. Usually known as *placidus* Say, but Chittenden states the two are the same, *venatus* having priority of description in the same work.

892 (——). SPHENOPHORUS VESTITUS Chitt., 1904, 134.

Closely related to *venatus*, more robust, beak shorter, more curved and compressed, with the basal dilated portion normally coated; surface coating of body dense, rather thin, more or less olive-tinted or brown, covering

normally the entire dorsal surface except the thoracic vittæ, beak, head and portions of the legs. Male with first abdominal segment distinctly narrowly concave at middle, last segment with punctures forming a shallow fossa at apex. Length 9—10 mm.

Georgia, Florida, Mississippi and Louisiana; March—October. This will probably prove to be merely a variety of *venatus*.

893 (——). SPHENOPHORUS RETICULATICOLLIS Boh., Schön., 1845, 257.

Similar to *venatus* but smaller. Dull reddish, beak, occiput, femora and tibiæ black; body with a moderately dense, velvety coating, this mostly red above, gray on the sides, leaving only portions of the thoracic vittæ, scutellum, humeral and subapical callosities, bare. Punctuation of upper surface distinct and rather dense; on thorax nearly uniform and but little finer on the feebly elevated and very narrow vittæ. Elytra with strial punctures coarse, those of intervals very fine and closely placed. Length 7.5—9.5 mm.

Washington, D. C., August 9. Known also from Texas, New Mexico and California.

894 (9007). SPHENOPHORUS GERMARI Horn, 1873, 430.

Oval, robust. Black, subopaque. Beak three-fourths the length of thorax, strongly compressed, very coarsely punctate and concave between the eyes. Thorax longer than wide, sides in front strongly, then gradually curved to base; disc coarsely variolate-punctate, with large eroded spaces. Elytra oval, moderately attenuate to tip; striæ not punctured; intervals alternating in width, the wider with two rows of coarse punctures, all with large shallow foveæ scattered over the entire surface. Pygidium cribrate. Body beneath coarsely punctate. Length 9.5—10 mm.

Tampa, Fla., rare. (*Schwarz.*) Kansas and Texas. (*Horn.*) Originally described from Kentucky as *compressirostris* Germ., which name was preoccupied by Say.

895 (——). SPHENOPHORUS INCONGRUUS Chitt., 1905-b, 61.

Resembles *costipennis* but more slender. Black or dark brown with light gray coating covering the intervals of thorax and the greater part of elytra. Beak two-thirds the length of thorax, moderately curved and compressed, finely and sparsely punctate, its base much less swollen and more finely grooved above than in *costipennis*. Thorax one-fourth longer than wide, its sides sinuous near base; vittæ polished black, narrow, entire, the median slightly dilated in front of middle; the lateral sinuous, widest at base, the branch distinct but narrow. Elytral striæ with fine, remote punctures, mostly hidden by the coating; intervals as in key, the elevated ones shining, each with a single row of minute punctures, those of third confused; umbones and subapical callosities shining, the latter long. Length 9—11 mm.

Lake County, Ind., rare, May 20. Chittenden's three types were from Wisconsin and Maryland. While it closely resembles *costipennis* superficially, it is very distinct by its more slender form, narrower thoracic vittæ, less elevated elytral intervals, and especially by the third joint of all the tarsi being but little wider than the first.

896 (——). SPHENOPHORUS ROBUSTIOR Chitt., 1905-b, 62.

Black with much gray coating above. Beak three-fourths the length of thorax, strongly, subequally compressed, bent backward in apical third, where it gradually enlarges to apex. Median vitta of thorax not attaining the base, lateral with variable branch. Elytral striæ deep, finely punctate; intervals as described in key, the odd ones with two rows of fine punctures. Under surface rather coarsely punctate. Male with pygidium pentagonal, with pale hairs scarcely extending out of the punctures, the lateral tufts minute. Length 10—11.5 mm.

Cook Co., Ill. Cotypes are in the Illinois State Laboratory of Natural History. Resembles *robustus* superficially but more robust, shorter, with shorter beak and less elevated, coarsely punctured vittæ and with the tarsi of group D. (*Chittenden.*)

IV. CALANDRA Clairv., 1758. (Gr., "a kind of lark.")

Small, narrow, elongate brown or piceous species having the beak usually shorter than thorax, straight, cylindrical; club of antennæ not compressed, its sensitive apex separated from the basal portion by a transverse line; epimera of mesothorax transverse, acute at the outer end and intervening between the base of the thorax and the humeri (somewhat as in the Barini); front part of last dorsal segment channeled for the reception of the sutural edge of the elytra, almost as in Anthribidæ. Three species have been widely distributed in the cereal grains in which they depredate, and another, infesting tamarinds, represent the genus in the United States.

KEY TO SPECIES OF CALANDRA.

a. Elytra with deeply impressed and feebly punctate striæ, the intervals smooth, alternately wider and more elevated, especially toward base; thorax with coarse, sparse elongate punctures. 897. GRANARIA.

aa. Elytra with nearly contiguous double rows of coarse, deep punctures, the rows separated by narrow punctate intervals.

b. Thorax without a median smooth line, its surface punctate, not strigose.

c. Punctures of thorax fine, even and distinctly separated, the sur-

face smooth and unusually convex. 898 LINEARIS.

cc. Punctures of thorax rather coarse, deep, very dense, especially toward the sides, rounded, not elongate, the surface rather depressed on the disc.

d. Smaller, 2.1—2.8 mm. 899. ORYZÆ.

dd. Larger and stouter, 3.2—3.4 mm. 899-a. var. ZEA-MAIS.

bb. Thorax with narrow median smooth line, its sculpture extremely coarse, deep and dense, consisting of long sinuous strigæ; elytral sculpture exceedingly deep and dense; length 4 mm. 900. RUGICOLLIS.

897 (9013). CALANDRA GRANARIA Linn., 1758, 378.

Elongate-oblong, feebly convex. Chestnut brown to piceous, moderately shining. Beak two-thirds as long as thorax, slender, cylindrical, finely and sparsely punctate. Thorax sparsely punctate, punctures coarse and on the disc more or less fusiform. Elytra deeply striate, striæ punctured at bottom, not serrate; intervals as mentioned in key, the sutural with a row of elongate punctures. Pygidium coarsely cribrate. Body beneath coarsely and less densely punctured than in *oryzæ*. Length 3—4 mm. (Fig. 129.)

Fig. 129. × 10. (After Forbes.)

Lake and Posey counties, Ind., scarce; May 30—June 27. Cosmopolitan and known in the United States from Canada to Arizona. (*Horn.*) Throughout the United States. (*Casey.*) It is the grain or granary weevil, injurious to stored grain since the earliest times. Being wingless it is a strictly indoor species and very prolific, a single pair being capable of producing 6,000 descendents in a year. The time required for completion of a life cycle varies with season and climate, the mid-summer period from egg to adult being about six weeks, so that under favorable conditions, there may be four or five broods in a year, or even six in the Southern States. The annual loss from granary insects, of which this species is one of the most important, is estimated by Chittenden at $20,000,000. Closed bins to keep out the insects, and bisulphide of carbon to destroy them are the usual remedies.

C. remotepunctata Gyll. is by Casey considered a synonym of *granaria*, though specimens at hand show that it is uniformly smaller, with striæ of elytra deeper, their punctures more distinct.

898 (11,216). CALANDRA LINEARIS Hbst., 1797, 5.

Elongate-oblong. Color variable, usually piceous or brown, the head black. Beak usually black, its tip red, twice as long as head, straight, cylindrical, finely striate-punctate. Thorax nearly twice as long as wide,

convex, strongly narrowed in front and constricted behind the apex; disc punctured as in key. Elytra subdepressed, scarcely longer and not wider at base than thorax, striæ closely punctate; alternate intervals slightly wider. Under surface finely and closely punctate. Length 3.3—3.8 mm.

Described from the West Indies but probably a native of India. Introduced in tamarinds, in the seeds of which it depredates. It occurs at times in the Atlantic States and may always be known by the more convex thorax with fine even punctures. The elytra are often spotted as in *oryzæ*.

899 (9011). CALANDRA ORYZÆ Linn., 1763, 395.

Reddish-brown to piceous, opaque, elytra frequently with four rufous spots. Beak slender, cylindrical, three-fourths as long as thorax, at base slightly dilated, above with four rows of rather coarse punctures and with a slight fovea between the eyes. Thorax longer than wide, constricted near apex, sides feebly curved, gradually divergent to base; disc densely, deeply and coarsely punctured. Elytra oblong, slightly narrowed at tip, deeply striate, striæ very coarsely and closely punctured; intervals slightly convex, narrow, the sutural with a row of coarse punctures; each puncture, both of thorax and elytra, bearing a very short yellowish seta. Beneath very densely and coarsely punctured. Length 2.1—2.8 mm. (Fig. 130.)

Fig. 130. × 20. (After Forbes.)

Frequent throughout Indiana; Apr. 15—Oct. 15. Occurs in various places, the accession notes of the Indiana species being: "beneath beech bark; beaten from oak; taken from figs; on bags of wheat in granary and taken by sweeping." New York City and Brooklyn, N. Y.; April—Nov. Occurs throughout the entire United States. Originated in India, and known as the "rice weevil," infesting stored grain, rice, wheat, maize, barley, rye, hulled oats, buckwheat, chick-peas, and, when abundant in store houses, invading crackers and other food stuffs. A serious pest in the Southern States where it is commonly called the "black weevil." Closely resembling the two preceding, but the punctures of thorax are coarser than in *linearis* and not elongate as in *granaria*. This species or *granaria* is probably the one referred to in the "Early References to Weevils" on page 2 of this book. They were perhaps the first beetles ever noticed by man.

899-a (——). CALANDRA ORYZÆ ZEA-MAIS Mots., Et. Ent., IV, 1855, 77.

Always larger and stouter than *oryzæ*. Beak longer, more suddenly narrowed before the eyes. Thorax more densely punctate. Length 3.2—3.4 mm.

Florida and Texas. (*Casey.*) Introduced from Cayenne, developing in New York in 1853, from grain sent on for exhibition.

900 (11,217). CALANDRA RUGICOLLIS Casey, 1892, 687.

Oval. Brownish-black, the elytra each clouded feebly with rufous along the middle. Beak as long as thorax, feebly curved, coarsely punctate near base. Thorax barely as long as wide, tubulate at apex, sculptured as given in key. Elytra two fifths longer and at humeri as wide as thorax; disc with contiguous rows of very coarse, quadrate, crowded punctures; alternately separated by narrow, flat intervals. Length 4 mm.

Southern Florida. Described from a single female.

Family IV. SCOLYTIDÆ.

THE BARK AND TIMBER BEETLES.

This family includes beetles of diverse form, whose structures, with the names applied to them by Dr. A. D. Hopkins in the publications of the U. S. Government, are shown in Figures 132, 134 and 135. They are of unusual interest from their unique habit of excavating characteristic egg galleries (Fig. 131) and of importance as destroyers of forest trees.* While differing among themselves in many respects they are all small, more or less elongate beetles, with compact, cylindrical bodies, short legs, and dull coloration of various shades of brown, in which the antennæ (Figs. 136, 137) are geniculate with scape short, funicle 1- to 7-jointed, club generally compact, (sublamellate only in *Phlœophthorus*); tarsi (Fig. 139) 5-jointed, first joint usually short, but as long as the others united in Platypodinæ; fourth joint sometimes very small (Fig. 133); head usually narrower than thorax, but sometimes broader (Platypodinæ); eyes usually oblong, sometimes divided (*Xyloterus*), sometimes

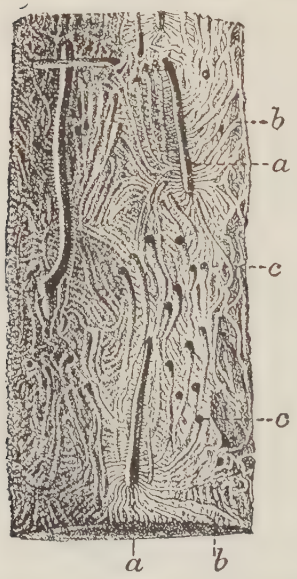

Fig. 131. Work of a Scolytid beetle, *Scolytus rugulosus* Ratz., on twig under bark. *a, a,* main galleries; *b, b,* side or larval galleries; *c, c,* pupal cells—natural size. (After Ratzeburg.)

*Their importance may be illustrated by this sentence: "If the timber destroyed by these insects in the United States during the past fifty years were living today, its stumpage value would be more than $1,000,000,000." (Bull. 83, U. S. Dept. Agr.)

round, subconvex (Platypodinæ). On the strength of these differences the Platypodinæ are often treated as a sep-

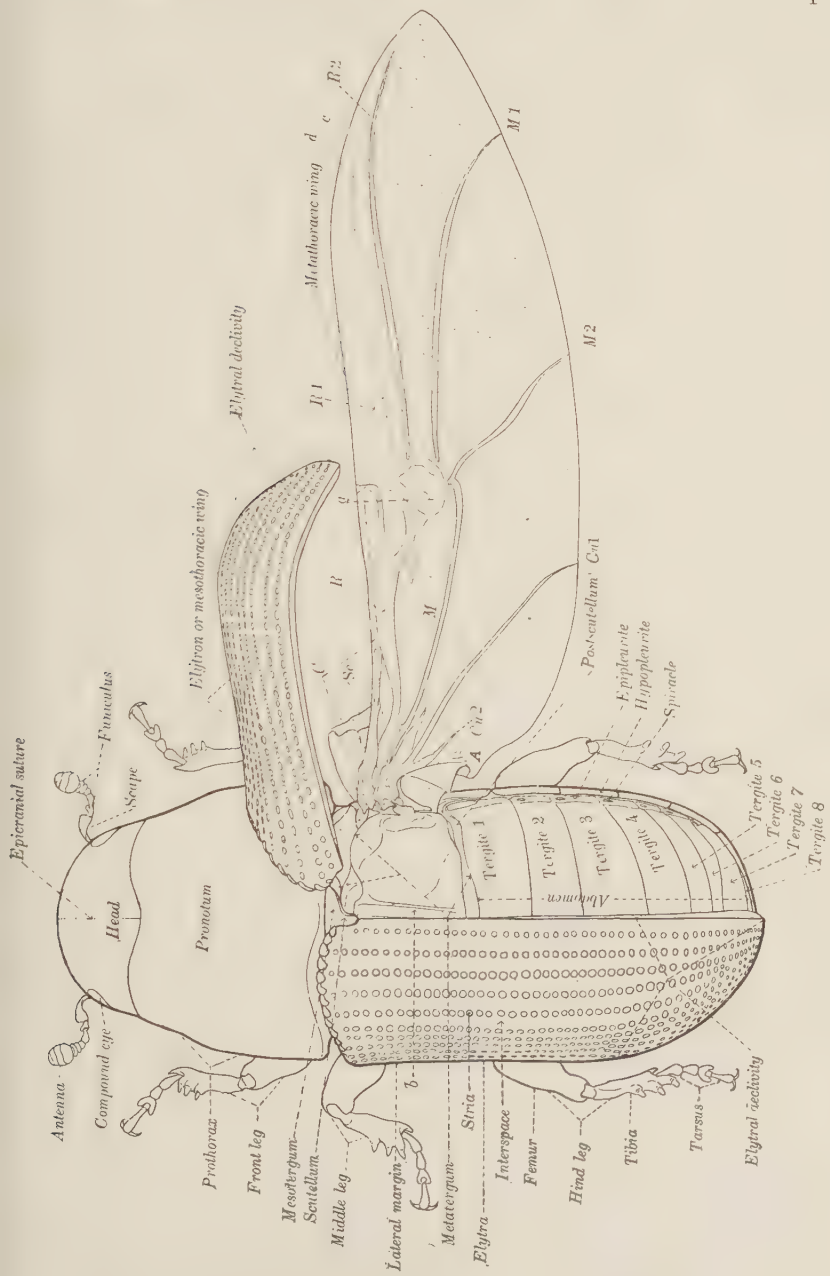

Fig. 132. Upper surface of *Dendroctonus valens* Lec., showing names of various structures. (After Hopkins.)

arate family, which course is also supported by their more linear form. The anterior tibiæ are usually compressed and serrate on the outer margin, sometimes without teeth on the edge but produced at apex into a curved process or mucro (Scolytinæ); the thorax is usually without any side margin, sometimes, however, margined (Scolytinæ); the elytra usually have a pronounced declivity at apex, which is sometimes lacking, in which case the abdomen may ascend obliquely to the apex (Scolytinæ). These differences have caused the Scolytinæ also to be set apart either as a tribe or subfamily. The head is never prolonged into a beak, but is often suboblong and prominent (Hylesinini), otherwise globose, deeply immersed in the thorax (Ipini); the thorax is sometimes uniformly sculptured (most Hylesinini), sometimes remarkably roughened in front with sharp, backward-pointed spines (Ipini); the declivity of the elytra may be unarmed (Hylesinini) or provided with tubercles or spines (many Ipini).

Fig. 133. Usual form of tarsus in Scolytidæ, showing short, fourth joint. (After Hopkins.)

The maxillary lobe is usually beset with stout radiating spines, but in those genera which bore into solid timber (*Xyloterus*, *Xyleborus* and the Corthylini) these are replaced by long bristles. The basal margin of the elytra is elevated, toothed or tuberculate in some genera of Hylesinini; the third interval is elevated at apex in others (*Carphoborus*); the sculpture of the thorax is often longitudinally strigose, as in *Cresinus*, or with a few distant acute tubercles in front of middle (*Cryphalus*); the body is sometimes clothed with small scales and stout erect bristles in rows (*Chramesus*).

The sexes do not usually present great differences, though the male head is bispinose in *Phlœotribus*, bituberculate in *Carphoborus*, but in the Xyleborini, this condition is reversed, the male differing greatly in form of body, by horns or excavations on thorax, or by marked flattening of the surface; such males are however rare in collections, as they may not leave the heart of the tree in which they were born.*

The principal works on our species of Scolytidæ are Zimmerman and LeConte 1868; LeConte, 1876; Chapuis, 1866, 1869; Eichhoff, 1878; Hopkins, 1893-a and b, 1894, 1909-a and b, 1914, 1915-a and b; Hubbard, 1897; Pierce, 1907; Swaine, 1909; but foreign

*The authorities do not always agree in describing male and female characters; we have followed Dr. Hopkins in cases of disagreement.

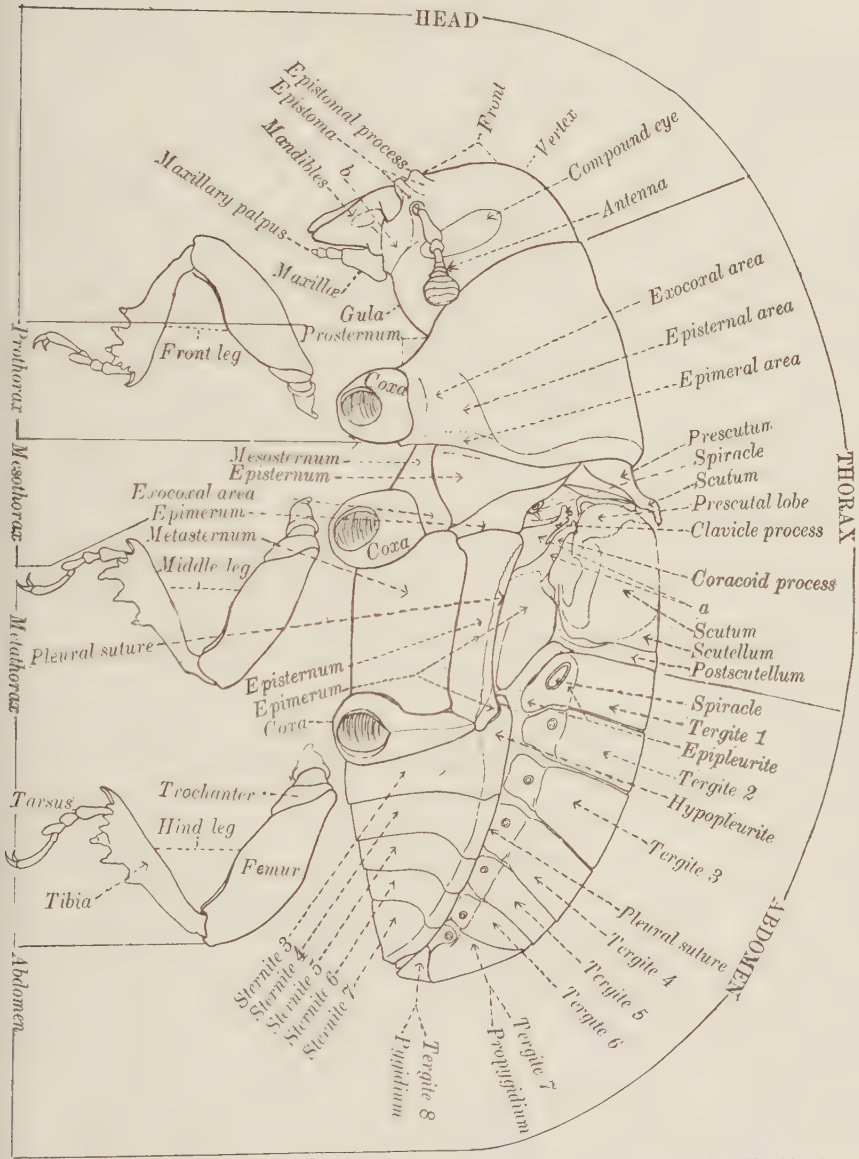

Fig. 134. Side view of *Dendroctonus,* showing names of various parts. (After Hopkins.)

works, as Barbey, 1901; Hagedorn, 1910; Reitter, 1913; Nusslin, 1905, 1911; Lindeman, 1875—1879; Blandford, 1895—1905, and Kleine, 1908, 1910, must also be consulted. The numerous short articles by E. A. Schwarz in the early volumes of Proc. Ent. Soc. Wash. and Ent. Amer. are also invaluable. The effort in the present writing has been to collate and arrange in accordance with Dr.

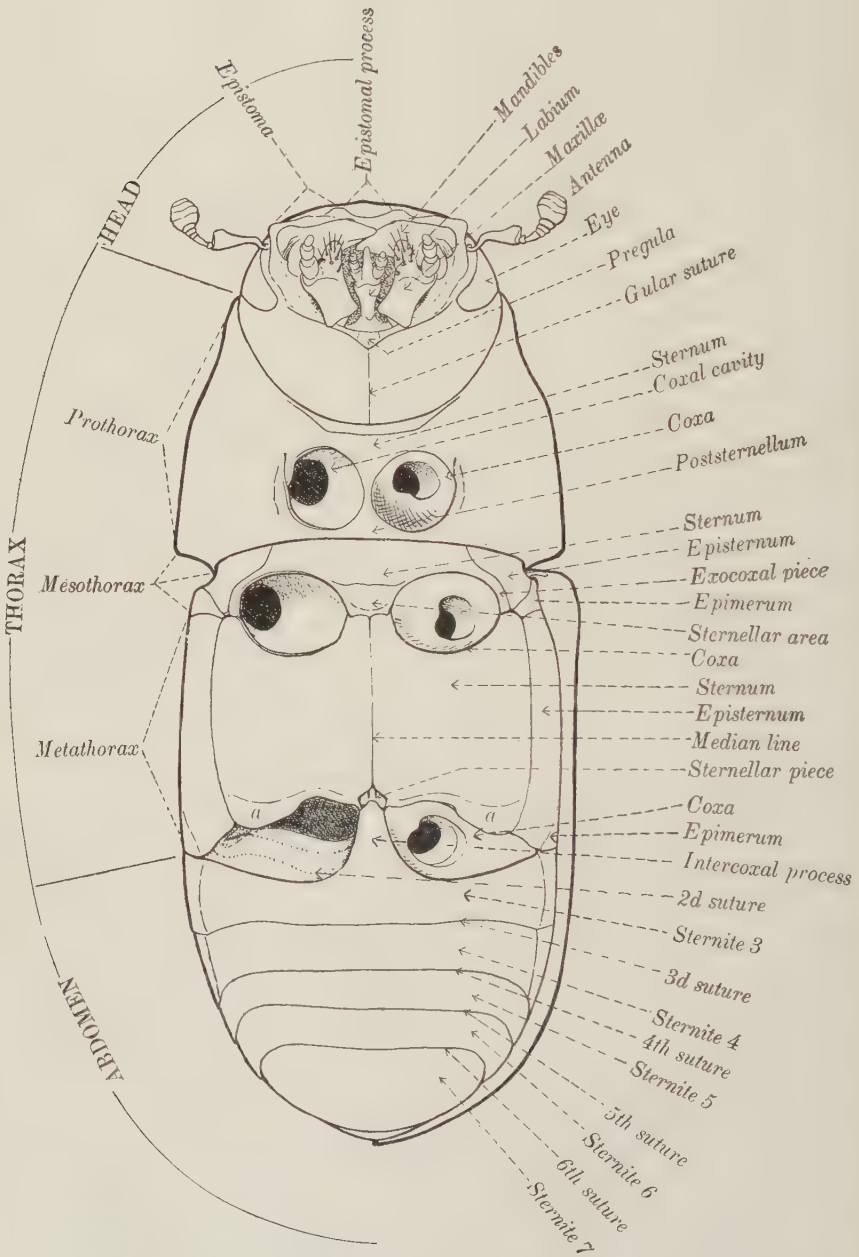

Fig. 135. Ventral view of *Dendroctonus*, showing names of various parts. (After Hopkins.)

Hopkins' classification the mass of information contained in the works mentioned, incorporating some data obtained from Mr. H. W. Wenzel, of Philadelphia, who has collected many species in winter and early spring by searching for the clusters of wood dust that mark the entrance burrows.

Fig. 136. Antennæ of genera of Scolytidæ. A, Antenna of *Micracis;* B, of *Platypus;* C, of *Scolytus;* D, of *Phlœosinus.* (After Hopkins and Swaine.)

The variations in the club and funicle of antennæ are so important as to have become the basis in a large part of LeConte's

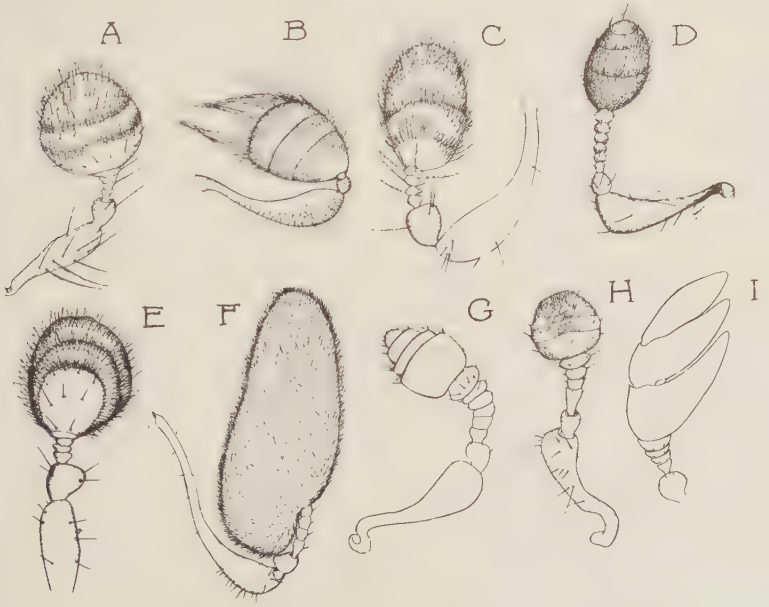

Fig. 137. Antennæ of genera of Scolytidæ. A, Antenna of *Pityogenes;* B, of *Monarthrum;* C, of *Pityophthorus;* D, of *Hylastinus;* E, of *Xyloclcptes;* F, of *Chramesus;* G, of *Hylurgops;* H, of *Dendroctonus;* I, of *Phlœotribus.* (After Swaine.)

classification of the family. On account of the small size of the insects, these organs are not, however, easy to observe accurately, and more obvious characters are for that reason to be preferred. In the keys which follow, based upon Technical Series No. 17, Hopkins, 1915-b, greater prominence is given to the head, pronotum and tibiæ.

SYNOPSIS OF SUBFAMILIES OF SCOLYTIDÆ.

a. Anterior tarsi with joint 1 longer than 2, 3 and 4 together.
Subfamily I. PLATYPODINÆ, p. 582.

aa. Anterior tarsi with joint 1 shorter than 2, 3 and 4 together.

b. Anterior tibiæ with prominent process on the outer apical angle.
Subfamily II. SCOLYTINÆ, p. 584.

bb. Anterior tibiæ without prominent process on the outer apical angle.
Subfamily III. IPINÆ, p. 592.

Subfamily I. PLATYPODINÆ.

I. PLATYPUS Herbst., 1793. (Gr., "broad" + "foot.")

Form cylindrical; head large, wider than prothorax; elytra perpendicularly declivous at base, striate, variously prolonged into processes at tip. Found chiefly in the Southern States. Three species appear to occur on the Atlantic coast, of which one reaches New Jersey. A large number of species inhabit tropical regions and are liable to be introduced in timber. (Fig. 138; and Fig. 136, B, antenna; 139, L, tibia.)

SYNOPSIS OF SPECIES OF PLATYPUS.*

a. Ventral segments of male with elevations.

b. Third ventral segment with elevations at posterior margin in male; prothorax of female with two large discoidal punctures each side of anterior extremity of short median line.
901. FLAVICORNIS.

bb. Fourth ventral segment with two very acute elevations at posterior margin in male. 902. 4-DENTATUS.

aa. Ventral segments without elevations; female with a smooth shining space each side of short median line. 903. COMPOSITUS.

901 (9049). PLATYPUS FLAVICORNIS Fab., 1776, 212.

Female elytra with third interval somewhat elevated and roughened at base; posterior process of elytra shorter and less acute; declivity concave near tip, tip truncate and feebly emarginate. Ventral segments finely rugose, regularly convex. Elytral process shorter and less prominent (var. *disciporus* Chap.) Male elytra with base of third interval less ele-

*Following LeConte (1876, 343) with modifications based on Hopkins' description of sexes (1894, 277).

Fig. 138. A Pacific coast species of *Platypus*. × 8. (After Swaine.)

vated, posterior process longer, more acute, serrate on outer side. Ventral surface punctured and finely rugose, opaque; posterior margin of third and fourth segments thickened. Length 5.2—5.7 mm.

Anglesea and Sea Isle, N. J., May 21—July 4. Clayton, Ga., July. Dunedin, Fla., Nov. 9. Ranges from New Jersey to Florida, Texas and Mexico, in the coastwise states, attacking many kinds of coniferous and deciduous trees. Zimmermann observed that in South Carolina they are found mostly in pine logs, remaining commonly about the foot of the tree where their presence is easily known by the large heaps of worm-dust which they push out of their galleries. They fly to light from March to October. Lugger found them near *Pinus tæda* L., flying freely in early morning. In hardwood trees they are inquilinous in burrows of other insects making their own more especially in the bark of the lower part of coniferous trees. *(Schwarz.)**

902 (9050). Platypus 4-dentatus Oliv., 1795, p. 3.

Male elytra deeply striate, with a posterior process at the end of third interval, and a large compressed obtusely truncate one at the junction of the fifth and eighth intervals. Ventral surface opaque, densely punctured. Female similar to *P. flavicornis*. Length 4 mm.

Florida. West Virginia, July. Texas. The references to this species are less numerous than to the others. It seems possible from the similarity of the females, and from the male characters being an exaggeration of those of *flavicornis*, that the two are not distantly related.

903 (9051). Platypus compositus Say, 1824, 324; ibid. II, 187.

Female, apical part of front smooth. Prothorax scarcely punctulate. Elytra transversely impressed near tip; without posterior process. Ventral segments shining, sparsely punctulate. Male, front uniformly rugose. Prothorax distinctly punctulate. Elytra with second interval compressed and forming an acute cusp near the tip; fifth and ninth intervals prolonged into a large process, which is concave above and tridentate at tip, the outer tooth much longer, narrow and truncate or emarginate at tip. Ventral segments opaque, densely punctured, fifth flat, not carinate, nor tuberculate. Length 4 mm.

West Virginia, June to October, and in January, entering green sap and heart wood, causing pinholes. Mobile, Ala., at

*Am. Nat., XVI 823.

light, July. Enterprise, Marco and Key West, Fla., at light in November. Cypress Mills, Tex., September. Lives mainly on the hard-woods, oaks, maple, beech, etc. Ranges throughout the southern United States, north to Delaware Bay and Illinois. Hubbard (1897) states that they are powerful excavators, driving their galleries deep into the heart wood of large trees. The females produce 100 to 200 eggs, which they deposit in clusters of 10 or 12, loosely in the galleries. The young require five or six weeks for their development, wandering freely about in the passages and feeding on the ambrosia which grows here and there on the walls, the conidia of which are borne in clusters on branching stems. The older portions of the galleries are blackened by this food fungus. The older larvæ assist in excavating the galleries but do not eat or swallow the wood; they are alert and active and show evident regard for the eggs and very tender young. When they are full grown they excavate a cell in which they pupate. The female is frequently accompanied by several males and fierce sexual battles take place. The species of *Platypus* are not confined to any particular kind of timber, but do not attack trees in health. Their galleries are however so extensive in dying trees that the sooner such are cut down the better if the timber is to be saved even for fire wood.

In addition to the species included in the synopsis, *P. punctulatus* Chap. has been found issuing from mahogany logs at Brooklyn, N. Y. (*Felt.*)

Fig. 139. Tarsi and tibiæ of genera of Scolytidæ. A, Tarsus of *Cryphalus;* B, of *Ips;* C, of *Corthylus;* D, of *Micracis;* E, of *Crypturgus;* F, of *Phlœotribus;* G, of *Hylesinus;* H, of *Hexacolus;* I, of *Bothrosternus;* J, tibia of *Camptocerus;* K, of *Scolytus;* L, of *Platypus.* (After Hopkins.)

Subfamily II. SCOLYTINÆ.*

Anterior tarsi with joint 1 shorter than 2, 3 and 4 united; anterior tibiæ with prominent process on outer apical angle. The subfamily is divided into six tribes, of which four occur in the Eastern United States. As nearly all are represented by a single species, the classification to genera is here given at once for brevity.

Eccoptogasterinæ of some authors.

KEY TO GENERA OF SCOLYTINÆ.

a. Anterior tibiæ with small tooth on inner apical angle extending beyond the tarsal insertion; tibiæ with at least one tooth on outer margin, in addition to the apical one.

b. Pronotum with transverse rugosities on anterior area. I. ERINEOPHILUS.

bb. Pronotum without transverse rugosities on anterior area.

c. Thorax with a defined side margin. II. BOTHROSTERNUS.

cc. Thorax with no defined side margin but usually a fold above the femoral impression.

d. Sutures of club curved; beak narrower than the front; body oval. III. PAGIOCERUS.

dd. Sutures of club straight; beak scarcely narrower than the front; body oblong. IV. CNESINUS.

aa. Anterior tibiæ with small tooth on inner apical angle not extending beyond the tarsal insertion.

e. Abdominal sternum convex throughout; antennal scape not very short. V. LOGANIUS.

ee. Abdominal sternum not convex throughout, but curved upward to apex; antennal scape very short. (Fig. 136, C.) VI. SCOLYTUS.

Tribe I. HEXACOLINI.

I. ERINEOPHILUS Hopkins, 1902. (Gr., "bast" + "loving.")

904 (——). ERINEOPHILUS SCHWARZI Hopkins, Proc. Ent. Soc. Wash., V, 1902. 34.

Female, yellowish-red; posterior portion of prothorax to abdomen, darker; head and ventral surface dark; legs and antennæ yellow. Head with front convex, middle of convex surface polished, shining, densely fringed with long yellow hairs, which extend around the anterior margin almost concealing the epistoma and mandibles. Base of prothorax emarginate. Posterior portion of pro-episternum shining. Elytra shining, margined at base, surface glabrous except on sides, which are faintly and sparsely pubescent; striæ punctured but not impressed; interspaces not elevated and with median row of punctures slightly smaller than those of striæ; declivity not steep, smooth, punctures fine, apical margin slightly retuse, exposing the pygidium. Ventral segments 1 and 2 distinctly punctured. Length 1.7 mm. Male, front convex, smooth, subopaque, faintly punctured and with faint median line; epistoma clothed with long hairs, extending over base of mandibles. Length 1.5 mm.

Cocoanut Grove, Fla., April and September; bores under the bark of branches of the Banyan trees (*Ficus*), thus killing them.

Tribe II. BOTHROSTERNINI.

II. BOTHROSTERNUS Eichhoff, 1868. (Gr., "perforation" + "breast.")

905 (11,251). BOTHROSTERNUS HUBBARDI Schwarz, 1886, 54.

Oblong-ovate. Reddish-brown, shining, nearly glabrous above. Vertex punctulate, front smooth with a longitudinal excavation and a tubercle

on each side. Beak short, smooth and with a median tubercle; an acute ridge each side above the insertion of antennæ extending to middle of eyes and continued along their inner margin by a series of stiff yellowish bristles. Thorax convex, slightly wider than long, sides nearly straight from base to middle, thence strongly rounded, hind angles rectangular, anterior angles very obtuse; surface strigose-punctate, without smooth median line, flanks densely rugosely punctate. Scutellum feebly depressed. Elytra twice longer and at base distinctly wider than thorax, punctate-striate; interstices flat, rather sparsely rugosely punctate, those on disc wider than the striæ, narrowing on declivity and each bearing on posterior half of elytra a row of semi-recumbent, short yellowish bristles. Under side with sparse, short pubescence; front coxæ widely separated, antecoxal ridges acute; metasternum rather coarsely punctate; abdominal segments convex, moderately strongly punctate. Anterior legs very little stouter than posterior ones. Length 2.5 mm. (Fig. 139, I.)

St. Lucie, Fla., April 26, beaten from hickory. Miami, Fla., March 10. (*Brownell.*)

III. Pagiocerus Eichhoff, 1868. (Gr., "firm" + "horn.")

906 (——). Pagiocerus rimosus Eichh., 1868, 148.

Ovate. Blackish piceous, somewhat shining, antennal funicle and tarsi brownish. Head striolate rugose, broadly excavate, acutely tuberculate at apex and on each side. Thorax subquadrate, constricted at apex, densely longitudinally rimose and punctate. Elytra striato-punctate; striæ broad, closely punctate; intervals flat, sparsely clothed with yellow hair, transversely striolate towards base, scarcely depressed at declivity. Length 2.5 mm. (Fig. 140.)

Fig. 140. × 14. (After Hagedorn.)

Florida. Food plants, *Anona glabra* and *Persea borbonia* L. Common and widely distributed in Tropical America.

IV. Cnesinus LeConte, 1868. (Gr., "with cuts.")

907 (9168). Cnesinus strigicollis Lec., 1868, 171.

Cylindrical. Dark brown, clothed with yellowish hairs, which are more stiff and arranged in rows upon the elytra. Prothorax longer than wide, convex, sides parallel to near tip, where they are rounded, tip two-thirds as wide as base; disc uniformly and densely covered with short, longitudinal aciculate punctures. Elytra with deep punctured striæ; intervals flat, with very fine rugosities; tip obliquely declivous and broadly sulcate along the suture. (*LeConte.*) Male, front shining, flattened between the eyes, anteriorly transversely depressed, the depression clothed with short, grayish hair and with a flattened tubercle each side; antennal scape elongate, curved, sutures of club fringed with long and conspicuous hairs. Female, front subopaque, sharply margined between the eyes, anterior impression deeper, clothed with very dense reddish-brown hair and without tubercles, antennal scape shorter, not curved, hairs of club shorter and very fine. Length nearly 3 mm. (*Schwarz*, Ent. Am., II, 54.)

Described from Illinois. Occurs from Michigan to Florida and Texas. Food plants, *Toxylon pomiferum* L., *Liquidambar*, *Smilax*, *Bumelia* and *Hicoria* (pith of twigs). (*Swaine.*) Cut out of terminal twigs of oak, May 26, Cape May C. H., New Jersey. (*Wenzel.*)

Tribe III. CAMPTOCERINI.

V. Loganius Chapuis, 1869. (Gr., "chaff.")

908 (11,250). Loganius ficus Schwarz, Proc. Ent. Soc. Wash., III, 1894, 44.

Cylindrical. Piceous, shining, nearly glabrous above, antennæ pale, legs reddish-brown or paler. Head concave, finely punctulate, each puncture bearing a yellowish hair; eyes strongly transverse. Antennal scape longer than 7-jointed funicle, each joint of which bears a very long, pale seta; club large, strongly compressed, oblong, pubescent on both sides with three greatly curved sutures. Thorax slightly longer than wide, lateral marginal line acute and entire, not pubescent, sparsely punctate. Elytra at base as wide as that of thorax, slightly longer than thorax, glabrous, a few short seriate bristles on sides and declivity, regular rows of coarse punctures in front; declivity simple, convex; striæ deeply impressed; interstices convex, each with a row of tubercles. Beneath sparsely pubescent. Legs short and stout, femora and tibiæ compressed, the latter not denticulate at outer margin; front tibiæ equally wide throughout, outer apical angle prolonged into a long uncus bent inwardly; tarsi slender, as long as tibiæ, third joint hardly bilobed. Length 2.1—2.3 mm.

Fig. 141. *Loganinus scaliger* Hag. An Argentine species. (After Hagedorn.)

Key West, Fla., April, under the bark of *Ficus aurea L.* The colonies found by Schwarz were so crowded that nothing could be said of the nature of the galleries.

Tribe IV. SCOLYTINI.

This tribe contains one genus of six species.

VI. Scolytus Geoffroy, 1872. (Gr., "truncate.")

The species of *Scolytus* are usually known by the peculiar conformation of the ventral surface, it being flattened or concave and obliquely ascending from the posterior end of the first segment to the fifth. They have the side margin of prothorax distinctly defined;

Fig. 142. Middle tibia of *Scolytus quadrispinosus* Say. (After Felt.)

thighs stout; tibiæ rather broad and compressed, the front pair not serrate on the outer edge, their outer apical angle armed with a long curved hook; middle and hind tibiæ with outer margins feebly serrate, their tips truncate and armed with two spines at outer angle. (Figs. 142 and 139 K.)

KEY TO SPECIES OF SCOLYTUS.

a. Elytra with distinct striæ of close-set punctures.
b. Striæ deep; interspaces narrow with single rows of fine punctures bearing short hairs.
c. Abdomen of male with several spines. 909. QUADRISPINOSUS.
cc. Abdomen of male with a single blunt, slender spine, that of female much shorter and conical. 910. PICEÆ.
bb. Striæ less deep; interspaces wider with single rows of fine punctures; abdomen of both sexes without spines, coarsely punctured. 911. FAGI.
aa. Elytra with numerous rows of punctures.
d. Elytra clothed with long, fine, erect hairs. 912. MUTICUS.
dd. Elytra nearly glabrous.
e. Size larger, 3.7 mm. 913. SULCATUS.
ee. Size smaller, 2.5 mm. 914. RUGULOSUS.

S. multistriatus Marsh, also mentioned by Felt (1905), is an imported elm bark borer, received from J. W. Chapman, Dorchester, Mass., who found it October 5, 1912, in adult and larval stages.

909 (9144). SCOLYTUS QUADRISPINOSUS Say, 1824, 323; ibid, II, 182.

Male, head flat, longitudinally finely aciculate, fringed with long curled hairs. Anterior part of ventral declivity very deeply concave, its margin acute, subsinuate and more or less angulated at middle; concave face of second segment more or less carinate, and nearly smooth, its lateral angles slightly produced into short spines; third segment with three spines, which are sometimes very long, sometimes short; fourth segment concave, rounded and strongly margined behind, sparsely punctured, and with a more or less distinct tubercle at middle of hind margin; fifth segment very short and retracted, visible only from behind. Female, head less flattened, punctured at sides, aciculate only at middle, thinly clothed with long hair. Anterior face of ventral declivity flattened, margined, nearly perpendicular, sparsely punctured; remaining segments flat, strongly punctured; fifth rounded behind, as long as the third and fourth united. Length 4—5 mm. (Fig. 143.)

Fig. 143. Beetle × 7, and side view of posterior extremity of male. (After Felt.)

Putnam, Marion and Posey counties, Ind.; June 12—Dec. 21. Ranges from Quebec and New York to Georgia and Missouri. This is the "hickory bark borer," a very destructive enemy of bitter-nut, shell-bark and pig-nut hickory and probably pecan.

The beetle issues in June or July, bores into the tree, trunk, branch or even twig, but mainly the trunk or larger branches, placing the eggs, 20 to 50 in number, each side of a vertical chamber, half an inch or more in length. The larvæ bore their cylindrical chambers through the inner bark, at first transversely and diverging, but afterwards lengthwise along the bark. They remain torpid during the winter and pupate the following May, issuing through a hole in the bark, so that a badly infested tree looks as though it had been peppered with No. 8 shot.

910 (——). SCOLYTUS PICEÆ Swaine, 1910-b, 34.

Shining black, elytra sometimes with reddish tinge, antennæ, tarsi and mouth parts yellowish. Head shining, dorsal face with large punctures; antennal scape short, first joint of funicle globular, remaining six segments gradually wider; club pubescent, suboval, sutures strongly angulated, a strongly chitinized piece deeply imbedded in first suture; front flattened, more strongly in male, densely, coarsely punctate, with yellow hairs. Pronotum smooth, shining, black, except for a reddish tinge in front, glabrous except for a few hairs near the edge which is sharp and distinct. Elytra nearly parallel, posterior outer angles rounded; disc glabrous, sides and caudal depression slightly hairy, deeply impressed about scutellum, punctate-striate, the striæ distinct and deeper at base, less distinct on sides; interspaces also punctate-striate with smaller punctures. Beneath coarsely punctate with setæ arising from punctures; ventral segments strongly ascending, the second bearing from the center a blunt spine, slender and pointing obliquely downward, male, much shorter and conical, female. Length 2.2—3 mm.

Steuben Co., Ind., June 18, under bark of tamarack. Hudson, Quebec, in branches of *Picea canadensis* Mill. Full grown larvæ were found May 24; adults emerged June 6; egg-laying commenced again early in July.

911 (9145). SCOLYTUS FAGI Walsh, Pract. Ent., II, 1867, 38.

Black, shining. Head of male flattened, slightly concave, covered with erect yellow hairs, rugosely punctured. Prothorax oblong, narrowed in front, broadly rounded on the sides, punctures distant, finer upon the disc than at sides, glabrous, except towards the front angles, where there are a few scattered hairs. Elytra with distinct striæ formed of approximate subquadrate punctures; intervals broad, flat, marked with a row of fine distant punctures; tip rugosely punctured. Venter strongly retuse in front, segments coarsely punctured except at the hind margins, which are smooth and slightly elevated; antennæ ferruginous, feet brown. Length 5.5 mm.

Described from Illinois. Occurs also in Texas. Food plants, *Celtis occidentalis* L. and *Fagus americanus* Sweet. "It is found boring partly in the solid wood in all stages. So numerous were

the insects that the pattern of the larval burrow was confused." (*Packard*, 1890.)

912 (9148). SCOLYTUS MUTICUS Say, 1824, 323; ibid, II, 182.

Elytra clothed with long, fine, erect hairs and with numerous rows of strong distant punctures. Male, head broad and flat in front and thickly fringed with long yellow hairs. Last abdominal segment with two tufts of long hair near the posterior margin. Female, head narrow, with impressed longitudinal line in front and with only a few long hairs. Last abdominal segment without tufts of hair. Length 3.8 mm.

Marion County, Ind., rare; June 4; beneath bark of hackberry. Ranges from New Jersey to Missouri. Food plant, *Celtis occidentalis* L. Mines in bark and wood of felled and dead trees and dead branches of living trees; adults May 2 in West Virginia. (*Hopkins.*) Wenzel has it from hickory.

913 (9151). SCOLYTUS SULCATUS Lec., 1868, 167.

Blackish, elytra, antennæ and feet yellowish-brown. Head longitudinally aciculate, flattened, slightly hairy. Prothorax not longer than wide, strongly narrowed in front, very feebly rounded on the sides, finely, not densely punctured, more distinctly at the sides. Elytra nearly glabrous with punctures of rows and intervals almost equal in size and distance, not larger toward base, but alternately very slightly larger; disc with a few short yellow hairs toward sides and tip, the tip, as usual, rugosely punctured. Venter not densely punctured, anterior part of declivity prominent, subacute; second ventral segment not tuberculate; posterior margin of segments smooth and somewhat elevated. Seems to resemble the European *S. rugulosus*. Length 3.7 mm.

Described from New York; one female. Not named by Smith. Food plant unknown. Apparently unrecognized since its description by LeConte.

914 (9153). SCOLYTUS RUGULOSUS Ratz., 1837, 187.

Subopaque, blackish, antennæ, tibiæ, tarsi and apex of elytra reddish-brown. Prothorax longer than wide, densely, strongly punctate, punc-

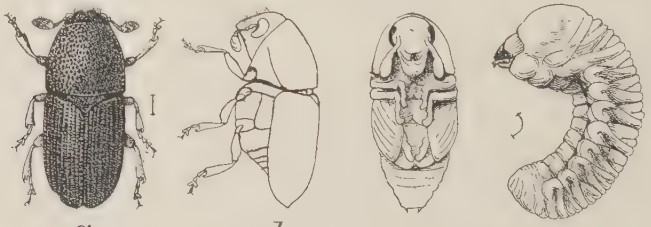

Fig. 144. *a*, Adult beetle; *b*, same in profile; *c*, pupa; *d*, larva. All × 10. (After Chittenden.)

tures deep and confluent at sides, smaller and oblong on the disc. Elytra longer than thorax, attenuate, striæ and interspaces strongly and densely

punctate, showing little difference. Male, head slightly flattened and broader than in female, the flat surface bearing a few long hairs. Female, head slightly more convex in front, narrower and without long hairs. Length 2—2.5 mm. (Fig. 144.)

Frequent throughout Indiana beneath bark of various kinds of fruit trees; also on flowers of Jersey tea; May 11—June 23. Ranges from Canada and New Jersey to Indiana, its food plants being *Prunus*, *Pyrus* and *Crataegus*. Port Richmond, S. I. (Ins. Life, V, 250.)

An imported species known as the "fruit-bark beetle" which attacks many orchard trees, boring into the bark to the bast and there making galleries in which the larvæ develop. They pupate in the galleries about the end of April and bore out in May, in the midday hours. The adult female then constructs a brood chamber, entering a dead or sickly tree through the lenticels or bark pores, gnawing a space the length of her body in about two hours. Mating then takes place, the male waiting for hours at the entrance to the brood chamber. Egg laying commences soon after mating and continues for ten days or more, the gallery being meanwhile continued and the eggs laid in niches along its walls, and covered with frass. Egg laying completed, the female commonly blocks the entrance to the brood chamber with her body and dies. The larvæ hatch in three or four days and, eating between and partly in the bark and bast, form the larval galleries. In this species the mother gallery is vertical, the larval galleries approximately horizontal. In about a month the larvæ have completed their work and a second brood appears about the middle of July. The adults at this time may often be seen running rapidly up and down the trunks, and have been noted late in October. Perfectly healthy trees are seldom attacked, but anything that serves to weaken the trees gives these insects a foothold; and saving the trunks of dead trees for firewood, or tops and prunings for brush greatly increases their numbers by providing ideal breeding places. The remedy is first to promptly burn the prunings, dead wood and dying trees to prevent multiplication. When trees are attacked, prune severely, spray before leaves appear, and apply a heavy coat of whitewash to the trunks and larger branches in early April. (*Gossard*, 1913.)

Subfamily III. IPINÆ.

KEY TO TRIBES OF SUBFAMILY IPINÆ.

a. Pronotum with anterior dorsal area commonly rugose; head concealed from above; anterior tarsi with third joint simple.
b. Anterior tibiæ broader towards apex or serrate on outer margin.
c. Abdominal sternite 7 with posterior margin always rounded. Tribe I. CRYPHALINI, p. 592.
cc. Abdominal sternite 7 with posterior margin rarely rounded.
d. Pronotum and elytra clothed with scales or hairs, very rarely glabrous. Tribe II. IPINI, p. 626.
dd. Pronotum and elytra without scales, commonly glabrous or sparsely pubescent. Tribe III. CORTHYLINI, p. 640.
bb. Anterior tibiæ not distinctly broader toward apex, or not serrate on outer margin. Tribe IV. MICRACINI, p. 646.
aa. Pronotum with anterior dorsal area commonly smooth; head exposed or rarely concealed from above.
e. Antennal club subglobose, compressed to laminate, never conical.
f. Body slender to moderately stout; pronotum at least as long as broad. Tribe V. CRYPTURGINI, p. 650.
ff. Body stout; pronotum broader than long. Tribe VI. PHLŒOTRIBINI, p. 655.
ee. Antennal club usually conical, rarely compressed. Tribe VII. HYLESININI, p. 662.

Tribe I. CRYPHALINI.

Very small species, some less than 1 mm. in length. The pronotum is often armed with small teeth on the apical margin, while the declivity of the elytra is sometimes provided with more or less acute tubercles, but these characters are not constant throughout the group, which includes principally the genera *Hypothenemus*, *Dryocœtes* and *Xyleborus* of LeConte. They are known as ambrosia beetles, pinhole borers and timber beetles, and are detrimental to crude forest products, wine and beer casks, and other similar products. A number of twig beetles and many seed-infesting insects, especially those of the date palm, are also included.

KEY TO EASTERN GENERA OF TRIBE CRYPHALINI.

a. Antennal club compressed throughout or but slightly thickened at base; antennal funicle with from 3 to 5 joints.
b. Elytra with scales, rarely with hairs; pronotum with apical margin armed.
c. Elytral striæ and strial punctures distinct.
d. Antennal club with side margins evenly rounded. I. COSMODERES.
dd. Antennal club with side margins sinuate.
e. Funicle 3-jointed. II. TRISCHIDIAS.

ee. Funicle 4-jointed. III. Hypothenemus.
eee. Funicle 5-jointed. IV. Stephanoderes.
cc. Elytral striæ and strial punctures usually obscure.
f. Pronotum with basal but without lateral margins.
g. Eyes simple; antennal funicle 4-jointed.
h. Antennal club with sutures and septa.
V. Ernoporides.
hh. Antennal club with sutures but without septa.
VI. Ernoporus.
gg. Eyes short, oval, narrowly emarginate; antennal funicle 5-jointed; club elongate. VII. Trypophlœus.
ff. Pronotum with basal and lateral margins. VIII. Cryphalus.
bb. Elytra without scales; pronotum with apical margin unarmed, without basal margin, its sides rounded.
i. Funicle 5-jointed. IX. Xylocleptes.
ii. Funicle 4-jointed. X. Lymantor.
aa. Antennal club thickened at base, its anterior face obliquely truncate; funicle 5-jointed; pronotum with rugosities, not strongly produced over the head.
j. Base of pronotum margined. XI. Coccotrypes.
jj. Base of pronotum not margined.
k. Lateral margin of pronotum acute from posterior angles toward middle. XII. Spermatoplex.
kk. Lateral margin of pronotum obtuse or subacute toward base.
l. Pronotum with sides more or less rounded, with basal angles rounded, apex without teeth. XIII. Dryocœtes.
ll. Pronotum with sides usually straight, with basal angles acute to slightly rounded, apex with or without teeth.
m. Antennal club with sutures on posterior face.
XIV. Ambrosiodmus.
mm. Antennal club without sutures on posterior face.
n. Anterior margin of pronotum without apical serrations.
XV. Xyleborus.
nn. Anterior margin of pronotum with apical serrations; body stouter. XVI. Anisandrus.

I. Cosmoderes Eichhoff, 1878. (Gr., "ornament" + "neck.")

Funicle 3-jointed, joint 3 narrow and obscure (overlooked by Eichhoff, who says 2-jointed), joint 1 very large, more than twice as long as the other two; club compressed, oval, three obscure sutures on anterior and posterior faces.

915 (——). Cosmoderes schwarzi Hopkins, 1915-a, 11.

Slender. Black, elytra subopaque. Pronotum with four marginal teeth. Front finely rugose; mandibles very long. Elytral striæ and intervals rugose. Length 1 mm.

Haw Creek, Florida. (*Schwarz.*)

II. Trischidias Hopkins, 1915-a.

Funicle 3-jointed, joint 3 narrow; club without sutural septa, but with three slightly curved septa on anterior face and two on posterior face.

916 (——). Trischidias georgiæ Hopkins, 1915-a, 12.

Stout, brown. Pronotum with rugose area red and with two short, closely placed marginal teeth. Front convex, opaque, with small median impression. Elytra shining toward base, the declivity oblique, opaque; strial punctures distinct from base to declivity, obscure on declivity. Length 1.1 mm.

Brunswick, Georgia, March 3. (*Hubbard & Schwarz.*)

III. Hypothenemus Westwood, 1834. (Gr., "beneath"+"wood.")

Club oval, with three sutures on anterior and one or two on posterior face, suture 1 with a small septum; eyes elliptical, emarginate. The males in this genus are rare, much smaller than the females, and may have but three funicular joints, or the fourth is obscure. The species mine under bark of small dead branches, in pith and wood of dead twigs, vines and in other similar small objects for which their size is suitable. The genus is represented by many species, not here included, from the West Indies and our southwestern states, extending even to California.

SYNOPSIS OF EASTERN SPECIES OF HYPOTHENEMUS.

a. Pronotum with apical margin produced and armed with a single spine. 918. miles.

aa. Pronotum with apical margin slightly produced or broadly rounded and armed with several small marginal teeth.

b. Body short, stout; pronotum with apical margin slightly produced.

c. Pronotum with rugose area brown.

d. Front without median longitudinal impression. 920. atomus.

dd. Front with distinct median longitudinal impression. 921. impressifrons.

cc. Pronotum with rugose area red.

e. Front with median line and posterior median punctures.

f. The two middle pronotal front marginal teeth more prominent. 922. marylandicæ.

ff. Margins but faintly produced. 923. robiniæ.

ee. Front with distinct short impressed line, without punctures. 924. toxicodendri.

bb. Body elongate, slender to moderately stout; pronotum with apical margin broadly rounded.

g. Body elongate.

h. Elytra light to dark brown; pronotum uniform light to dark brown, never uniformly reddish, though the rugose area is sometimes red.

i. Front with median shining or impressed line.
j. Pronotum uniformly brown. 919. HISPIDULUS.
jj. Pronotum with rugose area reddish or dark brown. 925 PRUNI.*
ii. Front with minute to distinct median or posterior median elevation. 930. RUFOPALLIATUS.
hh. Elytra black; pronotum dark to light uniform reddish. 931. PUNCTIFRONS.
gg. Body moderately elongate; elytral intervals with rows of scales.
k. Pronotum dark reddish-brown with rugose space reddish; elytral declivity without fine hairs. 932. NIGRIPENNIS.
kk. Pronotum uniform brown or reddish; elytral declivity with fine hairs. 933. PUBESCENS.

917 (9088). HYPOTHENEMUS ERUDITUS Westwood, 1834, 34.

Body elongate. Elytra black, pronotum dark to light but uniform reddish. Antennal club compressed throughout. Pronotum with apical margin broadly rounded and armed with several small marginal teeth. Elytral striæ and strial punctures distinct, intervals with scales. Length of female scarcely 1 mm.

Orange Mts., New Brunswick and Anglesea, N. J., July. Southwestern Pennsylvania, attacking shells of foreign nuts. (*Hamilton*) which habit is by Reitter ascribed to a species sometimes considered synonymous, viz., *arecæ* Hornung; District of Columbia, found abundantly in dry twigs of various trees in early spring (*Ulke*); mines in pith and wood of dead twigs and vines; infests honeysuckle; adults bred March 18 (*Hopkins.*) This, the first species of the genus to be described, was found in the pasteboard cover of an old book, and its actual home is believed to be the United States of Columbia. From the small size, identifications are difficult, and many of the records for this species are probably based on the new species described by Hopkins, especially *punctifrons.*

Eichhoff (1896) says "The North American specimens sent by yourself (i. e., Schwarz) I am inclined to consider *Stephanoderes crudiæ* Panz (1791), found in some West Indian seeds." Schwarz found small holes leading straight into the wood of cocoa plum, *Chrysobalanus icaco*, in Florida, apparently made "for feeding purposes by the polyphagous *H. eruditus;*" he also bred it in numbers from dead branches of black locust, *Robinia pseudacacia* L., at Washington, D. C.†

*The following species are to be separated by the descriptions which follow the key, viz.: *pruni, rumseyi, asiminæ, hamamelidis* and *thoracicus.* The aggregation formerly called *eruditus* is separated into many species, of which *punctifrons* is nearest to Westwood's type. Though omitted in the key, *eruditus* is here included, since the records above given cannot be attributed to any of the species recognized by Hopkins.

†Proc. Ent. Soc. Wash., I, 1891, 139; II, 1891, 74.

918 (9098). HYPOTHENEMUS MILES Lec., 1878, 433.

Very small, slender, cylindrical, blackish, shining, clothed with short, stout, erect bristles; legs and antennæ piceous. Prothorax a little longer than wide, apex produced into an acute spine; disc with a few acute reclinate granules in front, sparsely punctured behind. Elytra strongly but not densely punctured, striæ hardly to be traced. Length 0.8 mm.

Tampa, Forida, rare in dead pine leaves. Described as *Cryphalus*, transferred to *Hypothenemus* by Hopkins, by whose key it is the only species with apical margin armed with a single spine.

919 (——). HYPOTHENEMUS HISPIDULUS Lec., 1868, 156.

Moderately elongate. Black, scape and first joint of funicle of antennæ, tibiæ and tarsi ferruginous. Head prominent, convex, finely reticulate. Prothorax not longer than wide, convex, rough before the middle with acute reclinate tubercles, rugosely punctured behind; clothed with short, stiff hairs, with six to eight small teeth on apical margin. Elytra with approximate rows of quadrate punctures, intervals narrow with rows of close-set, short, stiff, erect, gray bristles; posterior declivity rounded, not at all flattened. Length 1—1.5 mm.

Described from Louisiana. New Brunswick, N. J., from hickory, oak and sumac. Ranges from District of Columbia to Florida and Louisiana. Resembles *eruditus*, but larger, with head and prothorax dark piceous like the elytra. (*LeConte.*) "Perhaps a form of *eruditus*." (*Blandford.*)

In connection with the numerous species which follow, the following passage from Technical Series No. 17, part 1, must be borne in mind: "The designation of a species is arbitrary, and with additional material and information is subject to revision."

920 (——). HYPOTHENEMUS ATOMUS Hopkins, 1915-a, 15.

Uniform light brown. Pronotum with four closely placed marginal teeth, the two middle ones longer. Front flat, opaque, without distinct median longitudinal impression. Length, female, 0.9 mm.; male, 0.5 mm.

Morgantown, W. Va., in *Salix nigra*, decaying wood; September. Westville, New Jersey, February, cut out of oak bark. (*Wenzel.*)

921 (——). HYPOTHENEMUS IMPRESSIFRONS Hopkins, 1915-a, 15.

Uniform brown. Pronotum with four subequal marginal teeth. Front with distinct median longitudinal impression. Length 1 mm.

Morgantown, W. Va., in decayed wood of willow; January.

922 (——). HYPOTHENEMUS MARYLANDICÆ Hopkins, 1915-a, 15.

Elytra black, shining; pronotum reddish, opaque, with four marginal teeth, the two middle ones more prominent. Length 0.75 mm.

Pregnall, S. C., in *Quercus marylandica*, dead bark on sprout; November.

923 (——). HYPOTHENEMUS ROBINIÆ Hopkins, 1915-a, 15.

Elytra black, shining; prônotum reddish, with four small marginal teeth, the margins but faintly produced. Length, female, 0.95 mm.; male 0.55 mm.

Chevy Chase, Md., in *Robinia pseudacacia*, decaying bark of fire-killed sprout; July.

924 (——). HYPOTHENEMUS TOXICODENDRI Hopkins, 1915-a, 15.

Elytra black, pronotum dark reddish, with four marginal teeth, the two middle ones more prominent. Length, female, 0.95 mm.

Morgantown, W. Va., in *Rhus toxicodendron*, bark of dead twigs; December.

925 (——). HYPOTHENEMUS PRUNI Hopkins, 1915-a, 16.

Slender, brown; pronotal rugose space dark red, with six marginal teeth, four small and two very small. Front convex, opaque, with distinct median flat line faintly impressed toward middle. Length, female, 1.25 mm.; male, 1 mm.

Tryon, N. Car., in *Prunus serotina*, dead bark on branches; December.

926 (——). HYPOTHENEMUS RUMSEYI Hopkins, 1915-a, 16.

Elytra dark brown, shining; pronotum and head reddish-brown. Pronotum with six subequal and two small marginal teeth. Front convex, opaque, densely rugosely punctured and with distinct median shining line. Length, female, 1.15 mm.

Little Falls, W. Va., in *Cercis canadensis*, dead dry bark on trunks; November.

927 (——). HYPOTHENEMUS ASIMINÆ Hopkins, 1915-a, 16.

Dark brown, pronotal rugose space and anterior area light red, with six subequal, very small marginal teeth. Front convex, subopaque, closely punctured, with faint short median line. Length, female, 1.2 mm.; male, 0.9 mm.

Plummer's Island, Md., in *Asimina triloba*, abundant in dead, dry bark; October.

928 (——). HYPOTHENEMUS HAMAMELIDIS Hopkins, 1915-a, 16.

Elytra light brown; pronotal rugose space and anterior area light red, with six subequal, marginal teeth. Front convex, opaque with short median line. Length, female, 1.3 mm.; male, 0.9 mm.

Morgantown, W. Va., in *Hamamelis virginiana*, moist dead bark, March. Gloucester, Grenlock and Lahaway, N. J., March —October; cut out of peach, cherry, etc. (*Wenzel.*) The name

ruficollis used for this species in Smith's List was never published.

929 (——). HYPOTHENEMUS THORACICUS sp. nov.

Length, female type, 1.3 mm, elytra dull brown, pronotal rugosities sparse, anterior area brown with six marginal teeth, the four apical ones much longer and more prominent, the sides more distinctly narrowed from base to apex than in other species; otherwise it comes near *Hypothenemus hamamelidis* Hopkins.

Clark Co., Ind., May 6—9; W. S. Blatchley, collector. Type, Cat. No. 7487, U. S. National Museum. (Described by *A. D. H.*)

930 (——). HYPOTHENEMUS RUFOPALLIATUS Hopkins, 1915-a, 18.

Elytra brown; pronotum reddish-brown, rugose area to margin light reddish, margin with four equal and two small teeth. Front impressed, shining, with posterior median triangular elevation. Length, female, 1.15 mm.

Charleston, S. C., in dead twigs of *Ficus* sp.; July.

931 (——). HYPOTHENEMUS PUNCTIFRONS Hopkins, 1915-a, 18.

Shining, prothorax and head dark reddish, elytra black; legs, antennæ and elytral scales yellowish. Pronotum with six marginal teeth, four small, two very small. Elytral striæ faintly impressed and faintly scabrous; intervals broader than usual, with rows of faint granules. Front convex, subopaque, distinctly but finely punctured, with small, median, obtuse elevation. Length, female, 1.1 mm.

Lakeland, Fla., in *Quercus* sp., dead bark on twigs; April. This species is apparently the nearest approach in our fauna to *eruditus* Westwood. (sensu *Hopkins.*)

932 (——). HYPOTHENEMUS NIGRIPENNIS Hopkins, 1915-a, 19.

Elytra black, subopaque; pronotum dark brown, opaque, dorsal rugose space faintly reddish; anterior margin with four small equal teeth; front subopaque, with anterior median line punctured. Elytral striæ faintly impressed, punctures moderately coarse. Length, female, 1.15 mm.

Tallulah, Louisiana, in dead bark of *Ficus* sp.; February.

933 (——). HYPOTHENEMUS PUBESCENS Hopkins, 1915-a, 19.

Elytra light brown; pronotum light reddish-brown, anterior margin with four teeth, median ones coarser and closely placed. Front convex, alutaceous and with median line. Elytra with striæ not impressed, punctures fine; interspacial scales yellowish and closely placed, mixed with dense, fine hairs on declivity. Length, female, 1.15 mm.

Key West, Fla.; April.

Hypothenemus erectus and *dissimilis* of Smith's List will be found in *Stephanoderes; H. ruficollis* Hop. (Smith, List of Ins. of N. J.) is *H. hamamelidis* Hop. (per letter from Dr. Hopkins).

IV. Stephanoderes Eich., 1871. (Gr., "crown" + "neck.")

Form elongate-cylindrical; mentum narrowed toward base; antennal funicle 5-jointed, sometimes with four joints in the small and rare males, club rounded; front margin of thorax with tubercles; elytra with strong rows of punctures. The size of most species is larger than in *Hypothenemus*.

SYNOPSIS OF SPECIES OF STEPHANODERES.

a. Pronotal rugosities numerous, not very coarse.
  b. Elytral striæ not impressed. 934. EVONYMI.
  bb. Elytral striæ impressed; pronotum short, sides not parallel; body moderately elongate.
    c. Pronotum with six or more marginal teeth.
      d. Front with faint posterior median elevation.
        e. Pronotum with six equal marginal teeth. 935. SERIATUS.
        ee. Pronotum with six unequal marginal teeth. 936. GEORGIÆ.
      dd. Front without faint posterior median elevation.
        f. Pronotum with six equal marginal teeth. 937. LECONTEI.
        ff. Pronotum with four equal and two small marginal teeth. 938. PINI.*
    cc. Pronotum with four marginal teeth and sometimes with two smaller ones. 943. VIRENTIS.
aa. Pronotal rugosities sparse, very coarse; pronotum with two marginal teeth.
  g. Elytral intervals each with rows of scales mixed with very fine hairs or very fine scales on declivity. 949. ROTUNDICOLLIS.
  gg. Elytral intervals without row of scales but with hairs in rows or not, and mixed or not with densely placed scales on the declivity.
    h. Elytral declivity with fine hairs mixed with longer ones; apex rounded. 952. SCULPTURATUS.
    hh. Elytra with fine short scales mixed with moderately long hairs; apex not broadly rounded. 953. DISSIMILIS.

The species here included in *Stephanoderes* were referred to *Hypothenemus* by LeConte, who stated that the outer part of the funicle was shorter than the first joint, and so indistinctly divided as to be without value in classification. He differentiated *Hypothenemus* by head larger and more exserted than in *Pityophthorus*; eyes narrowly emarginate; club round, compressed, moderate in size, divided by straight sutures on both sides; tarsi 5-jointed, the third longer than preceding, fourth small as usual, fifth elongate; tibiæ serrate toward tip; declivity of elytra not retuse or sulcate. The species of *Stephanoderes* are consolidated with *Hypothenemus* by Reitter also; the number of funicular

*For the separation of those species not included in key see descriptions which follow.

joints being too difficult to observe with ordinary hand lenses to serve as a separating character.

934 (——). STEPHANODERES EVONYMI Hopkins, 1915-a, 26.

Uniform light brown. Pronotum with four equal and two small marginal teeth. Front convex, with faint, shining, median elevation. Strial punctures moderately coarse, becoming coarser on declivity. Length, female, 1.2 mm.; male, 0.925.

Morgantown, W. Va., in *Euonymus atropurpureus* Jacq.; March 20.

935 (——). STEPHANODERES SERIATUS Eich., 1871, 133.

Oblong, cylindrical. Brownish-black or piceous, subopaque, thinly clothed with scattered gray hairs. Thorax semiorbicular, dirty brown, apical margin with several remote tubercles, obsoletely crenate; dorsum convex, sparsely tuberculate, scabrous in front, granulate-punctate behind. Elytra deeply striate, with dilated punctures; intervals narrow, rugulose, each with a row of stout setæ. Length, 1.3 mm.

New Orleans, La. Treated doubtfully as a synonym of *Hypothenemus hispidulus* by LeConte.

936 (——). STEPHANODERES GEORGIÆ Hopkins, 1915-a, 26.

Uniform dark reddish-brown. Pronotum with six marginal teeth. Front convex, with median line and minute posterior elevation. Elytral striæ distinctly impressed, punctures coarse. Length, female, 1.5 mm.

Georgia.

937 (——). STEPHANODERES LECONTEI Hopkins, 1915-a, 27.

Elytra dark brown; pronotum uniformly reddish-brown, subopaque. Front narrow, subopaque, with median longitudinal shining space. Elytral striæ impressed and with a row of very fine, obscure, reclining hairs; punctures moderately coarse, closely placed, with intervening elevations, not coarser on declivity. Length, female, 1.55 mm.; male, 1.1 mm.

Jefferson County, W. Va., in dead galls on twigs of *Quercus* sp.; October 10.

938 (——). STEPHANODERES PINI Hopkins, 1915-a, 27.

Uniform brown. Pronotum with four equal and two smaller marginal teeth. Front flat, anterior area shining. Length, female, 1.4 mm.

Kanawha Station, W. Va., in *Pinus* sp.; August 18.

939 (——). STEPHANODERES SALICIS Hopkins, 1915-a, 27.

Dark brown, elytra subopaque. Pronotum with rugose space lighter, anterior margin with four small equal teeth and two very minute ones. Front convex, with median shining line, posteriorly sulcate. Elytral striæ distinctly impressed, punctures coarse. Length, female, 1.45 mm.

Allegheny, Pa.

Morgantown, W. Va., in *Salix* sp.; January 20.

940 (——). STEPHANODERES FLORIDENSIS Hopkins, 1915-a, 27.

Elytra and pronotum black, shining, except rugose area of latter. Anterior margin of pronotum with four equal, closely placed teeth and two very minute ones. Front with long, median, shining line. Elytral striæ faintly impressed, with rather coarse, evenly placed punctures, declivity steep. Length, female, 1.3 mm.

Haw Creek, Florida.

941 (——). STEPHANODERES FICUS Hopkins, 1915-a, 28.

Elytra light to dark brown, shining. Pronotum opaque, lighter brown, anterior margin with four small teeth and two smaller ones. Front with short median line, posteriorly sulcate. Elytral striæ scarcely impressed, punctures moderately coarse, shallow. Length, female, 1.4 mm.

Alabama, in branches of *Ficus* sp. Dunedin, Fla., scarce; Feb. 15.

942 (——). STEPHANODERES SOLTAUI Hopkins, 1915-a, 28.

Elytra reddish-brown, shining. Pronotum uniform lighter, opaque, with four widely separated, equal, marginal teeth and two smaller ones. Front with short, median, shining line. Elytral striæ faintly impressed, punctures moderately coarse, closely placed. Length, female, 1.45 mm.

New Orleans, La.

943 (——). STEPHANODERES VIRENTIS Hopkins, 1915-a, 28.

Elytra dark brown, declivity opaque. Pronotum reddish brown, lateral area shining, distinctly punctured, anterior margin with four equal and two smaller teeth. Front with median shining line. Elytral striæ impressed, punctures coarse, impressed. Length, female, 1.3 mm.

Lakeland, Fla., in dead twigs of *Quercus* sp.

944 (——). STEPHANODERES PECANIS Hopkins, 1915-a, 29.

Uniform brown, shining. Pronotal rugose space slightly darker, lateral area shining, punctured, anterior margin with four small equal teeth. Front opaque, with median shining line. Elytral striæ impressed, punctures moderately coarse. Length, female, 1.3 mm.

Orlando, Fla., reared from pecan; March 20.

945 (——). STEPHANODERES RUFESCENS Hopkins, 1915-a, 29.

Elytra and pronotum reddish. Anterior margin of pronotum with three regular teeth and one smaller one. Front opaque, convex, with distinct impressed median line. Elytral striæ impressed, punctures moderately coarse, regular, becoming obscure on declivity which is oblique. Length, female, 1.4 mm.

Allegheny, Pa.

946 (——). STEPHANODERES FLAVESCENS Hopkins, 1915-a, 29.

Elytra light brown, shining. Pronotum lighter, with rugose space dark, anterior margin with four regular and two smaller teeth. Front convex, with median shining space, posteriorly sulcate. Elytral striæ impressed, punctures moderately coarse, becoming obscure on declivity; declivity subopaque. Length, female, 1.5 mm.

Tallahassee, Fla.; March 3. (*Hubbard & Schwarz.*)

947 (——). STEPHANODERES OPACIPENNIS Hopkins, 1915-a, 30.

Elytra black, opaque; punctures coarse, rugose. Pronotum dark reddish-brown, with four closely placed marginal teeth. Front subopaque, with broad shining line, posteriorly impressed. Elytral striæ impressed, rugose, becoming obscure on declivity; intervals rugose. Length, female, 1.6 mm.

District of Columbia; May 20.

948 (——). STEPHANODERES QUADRIDENTATUS Hopkins, 1915-a, 30.

Elytra dark brown, shining. Pronotum dark brown, opaque, with dorsal space reddish, anterior margin with four closely placed teeth. Front opaque, with narrow shining line, posteriorly sulcate. Elytral striæ impressed, punctures very coarse, becoming smaller on declivity, intervals of declivity faintly rugose. Length, female, 1.65 mm.

Morgantown, W. Va., in *Picea* sp.; April 5.

949 (——). STEPHANODERES ROTUNDICOLLIS Eich., 1876, 145.

Oblong. Piceous black, almost shining, with stiff obtuse setæ, a red blotch on thorax, antennæ and legs testaceous. Thorax subglobose, transverse, rounded at base and apex, apex with two approximate tubercles; disc gibbous, scabrous in front with few tubercles, sparsely punctate behind. Elytra cylindrical, deeply punctate-striate, intervals smooth, apex subacuminate. Length 0.6 mm.

Locality, North America. Swaine adds "Tennessee." In 1896 Eichhoff published "I possess only a single specimen." Dunedin, Fla., rare; March 26. Resembles *dissimilis* but smaller, thorax with sides less dilated and rounded, hind angles almost right.

950 (——). STEPHANODERES QUERCUS Hopkins, 1915-a, 32.

Dark brown, pronotum with rugose space reddish; elytra shining. Front subopaque, alutaceous, with median shining space. Punctures of elytral striæ fine, becoming coarser on lateral area, finer on declivity. Length, female, 1.8 mm.

Berkeley, W. Va., in *Quercus prinus* L.; March 11.

951 (9089). STEPHANODERES ERECTUS Lec., 1876, 356.

Elongate-oval, rather robust. Brown, antennæ and legs yellowish, thinly clothed with short pubescence which is stout and erect, especially

near tip of elytra. Head large, exserted, opaque, with a somewhat sericeous lustre from extremely minute striæ; front flattened. Thorax not longer than wide, very convex, rough in front with not more than 10 or 12 large, acute elevations, disc finely punctured, and with two small approximate teeth on its front margin. Elytra blackish, with lightly punctured striæ becoming deeper toward sides. Length 1.7 mm.

Described from Texas. West Virginia, mining in pith and wood of honeysuckle; adults bred April 19. (*Hopkins.*) Bred from dead fig twigs, issuing all the time from March 12 to June 14. (*Townsend.*) New Jersey, from hickory and oak. (*Smith.*) Texas. Swaine adds grapes and *Pyrus* to food plants. "Closely resembles *dissimilis* and differs by the shorter and stouter hairs of elytra, which are almost as in *Hypothenemus cruditus.*" (*LeConte.*)

952 (——). STEPHANODERES SCULPTURATUS Eich., 1878, 146.

Oblong. Piceous-black, subopaque, setulose, antennæ and legs testaceous. Thorax transverse, semiorbicular, strongly rounded at base and apex, with two closely placed acuminate tubercles at middle of apex; disc gibbous, scabrous with a few tubercles in front, strongly, densely punctate at base and sides. Elytra cylindrical, deeply punctate-striate; intervals very faintly uniseriately punctulate; apex suddenly declivous, convex, rounded, obtuse. Length 1.7 mm.

Tennessee. Treated as a synonym of *erectus* by Eichhoff and Schwarz. Retained as distinct, though unseen, by Dr. Hopkins.

953 (9090). STEPHANODERES DISSIMILIS Zimm., 1868, 144.

Stout, convex. Black, antennæ and feet yellow; front clothed with fine silky hair. Head large, prominent, deflexed; funicle 5-jointed. Thorax not longer than wide, above nearly circular, strongly convex, thickly punctured, finely pubescent, marked before the middle with erect acute spines. Elytra subcylindrical, punctate-striate, finely pubescent with gray hair, rounded at tip; intervals finely and sparsely punctured. Males with spines of front margin of thorax rudimentary, taking the form of tubercles smaller than the discal spines. Length 2 mm.

Warren, Vermillion, Lawrence and Posey counties, Ind., rare; May 11—June 14. Dunedin, Fla., frequent; Feb. 17—Dec. 6. Ranges from New York and Quebec to Lake Superior, south to Florida. "Larger and stouter than *erectus* and *hispidulus*, with pubescence longer and finer, the apical margin of thorax with two approximate erect teeth." (*LeConte.*) Breeds in grape and oak in New Jersey, boring with *erectus*, which may be the other sex, in oak twigs (*Smith*); bores in wild cherry (*Hamilton*); mining in pith and wood of dead hickory twigs (*Hopkins*); found abundant in dry twigs of various trees in early spring (*Ulke*); found on *Pinus inops* near Washington, D. C. (*Schwarz.*)

954 (——). Stephanoderes chapuisii Eich., 1871, 132.

Oblong, piceous-brown, subopaque, thinly grayish pubescent, antennæ and legs testaceous. Thorax ample, subglobose, transverse, apical margin with two closely placed tubercles, mucronate and prominent, disc in front scabrous with a few tubercles, subrugosely punctate behind and at sides. Elytra cylindrical, intervals faintly multipunctate, apex suddenly declivous, subacuminate. Length 2 mm.

Texas. Tybee Island, Ga., June 30. (*Wenzel.*) Treated as a synonym of *dissimilis* by Eichhoff and Schwarz, but retained as distinct by Hopkins.

V. Ernoporides Hopkins, 1915-a. (Gr., Ernoporus + "like.")

Antennal funicle 4-jointed, joint 4 slightly broader; club compressed, with side margins unequally rounded, with two obscure, procurved sutures on anterior and scarcely evident ones on posterior face, suture one with a distinct oblique septum; eyes oblong-oval, not emarginate.

955 (——). Ernoporides floridensis Hopkins, 1915-a, 34.

Oblong, elliptical. Reddish-brown. Pronotum with sides nearly parallel, anterior margin obtusely rounded, smooth, rugosities small, sparse, not in concentric rows but extending toward sides; posterior dorsal and lateral areas smooth, shining, not evidently punctured and with median faint elevated line. Elytra with sparse, fine scales and rows of larger interspacial scales, elytral punctures fine, confused. Length, female, 1.4 mm.

Biscayne Bay, Florida. (*Hubbard & Schwarz.*)

956 (9102). Ernoporides jalappæ Letzner, 1844, 99.

Cylindrical. Chestnut brown, antennæ and legs brownish-yellow, shining. Crown of tubercles behind smooth front margin of thorax not parallel with margin, but more curved toward sides; behind densely subgranulate. Elytra with fine rows of punctures, reaching apex, intervals with rows of very short, scale-like erect setæ and finely punctulate, sparsely scaly. Elytral striæ more evident than in *floridensis*. Length 1.3—1.6 mm.

In Jalap root from Brazil; liable to be found in all large cities in Europe and America but not frequently reported. The Nat. Mus. Coll. contains but a single specimen. Reitter (1913) creates for this species the subgenus *Letznerella*.

VI. Ernoporus Thomson, 1865. (Gr., "making" + "pores.")

Antennal funicle 4-jointed; club compressed, ovai, narrowed toward base, sides evenly, apex broadly rounded, three obscure straight sutures on anterior face and three obscure procurved

sutures on posterior face, without septum; eyes oblong-oval, not emarginate.

957 (——). Ernoporus kanawhæ Hopkins, 1915-a, 35.

Oblong, moderately stout. Dark brown. Pronotum slightly broader than long, sides slightly rounded from base to apex, rugosities moderately coarse and not in concentric rows, posterior, dorsal and lateral areas shining, faintly rugose and with four apical teeth. Front short, broad, faintly impressed. Elytra with fine scales and coarser, longer interspacial scales, especially on the declivity; striæ obscure, with fine punctures; intervals faintly rugose toward base, declivity evenly convex, without evident striæ. Length, female, 1.65 mm.

Kanawha Station, W. Va.; April 15. Allied to *E. schreineri* Eich., of Europe, living in linden; other European species live in beech.

VII. Trypophlœus Fairmaire, 1869. (Gr., "perforate" + "bark.")

Antennal club compressed, elongate-oval, with three nearly straight sutures, distinct on anterior face and obscure or absent on posterior face; eyes short oval, narrowly emarginate. Males not smaller than females. Several species are known in Europe and our western states, and one has been described from Nova Scotia. All attack alders, willows or poplars. The genus is treated as a subgenus of *Cryphalus* by Hagedorn.

958 (——). Trypophlœus nitidus Swaine, 1912, 349.

Black, clothed with short, gray hairs of two lengths. Head subglobular, with coarse, very shallow punctures and aciculate behind the eyes, front more coarsely punctured; a median longitudinal impression ending in a V at base of epistoma, which bears a few long yellowish hairs. Antennal scape strongly curved, clavate; funicle 5-jointed, first joint large, pedunculate, remaining four saucer-shaped, widening rapidly. Pronotum as wide as elytra, base broadly rounded, sides sinuate, strongly convergent in front, apical margin with two larger recurved points on median line, two or three smaller ones each side; asperations of front half strong, concentrically arranged, posterior half coarsely, densely punctured. Elytra more than twice the length of pronotum, sides parallel to declivity then narrowed to the rounded tip; punctured in rows, striæ hardly impressed; interspaces confusedly very finely punctured and with a row of widely separated punctures bearing bristles; pubescence short on disc, longer on sides and declivity. Length 2 mm.

Weymouth, Nova Scotia, in dying stems and twigs of *Alnus*. Closely related to *T. alni* of Russia.

VIII. Cryphalus Erichson, 1836. (Gr., "hidden.")

As restricted by Hopkins, this genus has a 4-jointed funicle

with joint 4 broader, both basal and lateral margins on the pronotum, and obscure or absent striæ on the elytra. The species are small, like those which precede, and are found in spruce and fir. They have the antennal club compressed, broad, with sides equally rounded, sinuate, apex broadly rounded, with three slightly recurved sutures on anterior face and three broadly procurved sutures on posterior face; eyes short, oval, narrowly but distinctly emarginate; declivity of elytra not impressed or toothed, thorax with a few large acute tubercles in front; tarsi with third joint simple. (Fig. 139, A.) The male is slightly smaller than female, its front narrower.

SYNOPSIS OF SPECIES OF CRYPHALUS.

a. Elytra with fine, densely placed scales and sparse, erect, interspacial hairs.
b. Interspacial hairs long. 959. PICEÆ.
bb. Interspacial hairs short, sparse.
c. Pronotal anterior margin with four teeth. 960. RUBENTIS.
cc. Pronotal anterior margin with five teeth. 961. FRASERI.
aa. Elytra with fine, densely placed scales but without interspacial hairs, 962. BALSAMEUS.

959 (——). CRYPHALUS PICEÆ Ratz., 1837, 163.

Oblong-oval, subcylindrical, convex. Fuscous-brown, pubescent. Thorax semi-orbiculate, transverse, disc scabrous in front with subconcentric tubercles in rows, granulate-punctate behind. Elytra paler, longer than wide, squamulate, very finely punctured in rows with long erect hairs. Length 1.6—2 mm.

Canada, West Virginia and New York, according to Swaine (1908), who would perhaps now associate the specimens with *rubentis* Hopkins. Europe, in *Abies* and *Picea*. (*Hopkins.*)

960 (——). CRYPHALUS RUBENTIS Hopkins, 1915-a, 40.

Oblong, elliptical. Dull reddish-brown; pronotum and head darker. Anterior margin of thorax with four short, equal teeth, pronotal rugosities coarse, sparse, confused. Front flattened, with median shining line, posterior and lateral areas faintly punctured. Elytral striæ faintly evident on dorsal area. Length, female, 1.8 mm.; male, 1.6 mm.

Pocahontas Co., W. Va., in *Picea rubens*; May 6. Pocono Lake, Pa., August 12, labelled *ruber* by Dr. Hopkins. (*Wenzel.*)

Felt (1906) identifies as *striatulus* Mann., known from Alaska and Utah, "a small yellowish-brown to almost black beetle, about 2 mm. in length, occurring in spruce bark, particularly at the base of limbs; also at base of a small hemlock limb the foliage of which had begun to turn brown, and in a small balsam tree." He describes the prothorax as bearing a number of prominent chitinous tubercles, and elytra as faintly

striate with rows of fine punctures. The galleries, he says, consist of a series of interlacing burrows, which often unite to form large excavations around the base of a twig. Possibly the same as *rubentis*. These observations were made in the Adirondack Mts., N. Y.

961 (——). CRYPHALUS FRASERI Hopkins, 1915-a, 40.

Oblong, rather stout. Dark brown, elytra dull reddish-brown; pronotum darker. Anterior margin with five short teeth, pronotal rugosities moderately coarse, confused. Front convex, subopaque, with transverse bisinuate, shining line. Elytral striæ faintly evident, declivity convex, apex not broadly rounded. Length, female, 1.95 mm.; male, 1.85 mm.

Pisgah Ridge, North Carolina, in *Abies fraseri;* Sept 24. Allied to *C. asperatus* Gyll. of Europe, found in *Picea* and *Abies*.

962 (——). CRYPHALUS BALSAMEUS Hopkins, 1915-a, 41.

Elliptical. Reddish-brown to nearly black. Anterior margin of pronotum with four subcontiguous, broad teeth and two smaller ones; rugosities sparse, confused, not extending to base. Front broad, subopaque, flattened, with anterior median broad elevated line. Elytral striæ evident and faintly impressed toward base. Length, female, 1.9 mm.; male, 1.65 mm.

Camp Caribou, Maine, in *Abies balsamea*, May. Allied to *C. abietis* Ratz.

IX. XYLOCLEPTES Ferrari, 1867. (Gr., "wood" + "thief.")

Apical margin of pronotum unarmed; antennal funicle 5-jointed, joint 5 broad; club compressed, broad, strongly narrowed toward base and apex, broadly rounded with one or two obscure to distinct sutures on anterior face and with or without one or two broad, strongly procurved, subapical sutures on posterior face; eyes short, elliptical, emarginate. Small species, some at least of which are found in Cuba, Florida and southwestern states in Cucurbitaceæ. (Fig. 137, E.)

963 (——). XYLOCLEPTES FLORIDENSIS Hopkins, 1915-a, 43.

Oblong-elliptical. Ferruginous, pronotum darker. Front convex, moderately shining, sparsely pubescent. Elytra shining, with strial punctures coarse and in evident rows on dorsal area, confused on lateral area; declivity steep, flat, with interspace 1 scarcely elevated, strial punctures distinct. Length, female, 1.5 mm.

Biscayne Bay, Fla.; May 17. (*Hubbard & Schwarz.*)

964 (——). XYLOCLEPTES ANONÆ Hopkins, 1915-a, 43.

Oblong-elliptical. Elytra dark reddish-brown, pronotum darker. Front flat, broad, finely rugose, with faint median line, pubescence sparse. Elytra shining, with strial punctures in evident rows on dorsal area but

not coarse; interspaces with irregular, fine punctures, becoming equal and confused, with strial punctures on lateral area; declivity steep, flat, with first interspace not elevated. Male with front flat, shining, faintly rugose; declivity broadly retuse, interspace 1 slightly elevated. Length, female, 1.8 mm.

Florida in *Anona* sp.; May 14.

X. Lymantor Lovendal, 1889. (Gr., "destructive.")

Differs from *Xyloclcptes* by 4-jointed funicle; club with two sutures on anterior and one subapical suture on posterior face; also by simple eyes.

965 (9120). Lymantor decipiens Lec., 1878, 624.

Slender, cylindrical. Brown, shining, sparsely clothed with erect yellow hairs; antennæ and legs yellow. Prothorax longer than wide, slightly asperate in front with transverse rugosities; sides and behind coarsely but not densely punctured; median line and a smooth space each side well defined. Elytra of male coarsely punctured, punctures not arranged in rows; declivity nearly perpendicular, scarcely retuse, slightly impressed along the suture, which is feebly elevated. Head convex, finely punctured. Front tibiæ moderately dilated, serrate with four or five very small teeth. Sutures of antennal club long, curved, concentric with apical margin, first joint glabrous, shining, elliptical in form. Length 1.3 mm.

Callander, Ont., July; Pocono Lake, Pa., August. (*Wenzel.*) Virginia, Michigan, New York, District of Columbia, rare. (*Ulke.*) Food plants, *Hicoria*, *Pyrus*, *Acer*.

XI. Coccotrypes Eichhoff, 1878. (Gr., "berry" + "perforate.")

Antennal funicle 5-jointed, joint 5 much broader; club with one or two sutures on anterior face and with or without one or two on posterior face; anterior margin of pronotum with small apical teeth; eyes small, elliptical, emarginate. The males are much smaller and rare.

KEY TO SPECIES OF COCCOTRYPES.

a. Antennal club suboblong, without suture on posterior face, sutures on anterior faces distinctly recurved.
b. Pronotum with smooth, punctured dorsal line. 966. ROBUSTUS.
bb. Pronotum without smooth dorsal line or space; elytral interspaces faintly to distinctly rugose toward middle and base. 967. PYGMÆUS.
aa. Antennal club broad, with sutures on posterior face.
c. Elytra not distinctly rugose toward base. 968. BASSIÆVORUS.
cc. Elytra densely rugose toward base. 969. DACTYLIPERDA.

966 (——). Coccotrypes robustus, Eich., 1871, 131.

Oblong, stout, cylindrical. Piceous-brown, thinly clothed with grayish hair. Thorax semiorbiculate, gibbous, scabrous in front with scattered

tubercles; behind and at sides finely, densely punctate. Elytra twice as long as wide, deeply punctate-striate; intervals very finely multipunctate, seriately setose. Eyes subemarginate in front. Club of antennæ with transverse sutures almost straight. Length 2.0—2.8 mm.

North America, in Chapuis Collection. Cuba.

967 (——). Coccotrypes pygmæus Eich., 1878, 310.

Oval. Piceous, almost shining, pilose. Thorax ovate, much shorter, posteriorly cribrately exasperate with granules and longitudinal rugæ. Elytra equally convex, very roughly cribrate, finely lineato-punctate; intervals alternately pilose with longer and shorter hairs in rows, apex sub striate. Length 2 mm.

Indian River, Fla.; Horn collection. Lake Poinsett and Key Largo, Fla., in sea beans. (*Schwarz.*) Eichhoff gives Madagascar, St. Domingo, Manila and Senegal.

968 (——). Coccotrypes bassiævorus Hopkins, 1915-a, 47.

Body short, elliptical. Color reddish. Anterior margin of pronotum serrate. Front subconvex, closely sulcate and with sparsely placed, erect hairs. Elytra shining, striæ in distinct rows; interspaces flat, faintly rugose toward base and with regular row of fine punctures to declivity, which is evenly convex, the striæ not impressed, striæ and interspaces subequally punctured in rows, striæ with distinct rows of short, reclining hairs from base to apex. Length, female, 2.2 mm.

Botanic Garden, District of Columbia, in seed pods of *Bassia latifolia*, July 31.

969 (11,245). Coccotrypes dactyliperda Fabr., 1801, II, 387.

Oblong-oval. Brown, hairy, antennæ brownish-testaceous. Club orbicular, glabrous at base, paler and pubescent at apex, externally with curved sutures but solid and smooth internally. Head small, brown, moderately convex in front, cribrately longitudinally strigose, clothed sparingly with hairs which are longer in male; eyes oblong, subsinuate in front. Thorax short, subovate, longer than broad, narrowed in front, rounded at apex, disc convex, entirely roughly granulate-punctate, clothed with long pale hairs. Elytra oval, with rows of fine punctures, clothed with alternate rows of longer and shorter hairs, declivity convex, entirely free of tubercles. Length, female, 2—2.5 mm.; male, 1.5—2 mm.

District of Columbia, found occasionally in fruit stores. (*Ulke.*) A native of Asia and Africa, living in seeds of dates and betelnut (*Areca catechu*), which has been spread over the civilized countries by commerce.

XII. Spermatoplex Hopkins, 1915-a. (Gr., "seed" + twine.")

Antennal funicle 5-jointed, joint 5 broader; club oval, with one bisinuate suture on anterior and two procurved ones on poste-

rior face; eyes large, broad, scarcely emarginate; anterior margin of pronotum smooth.

970 (——). SPERMATOPLEX RHIZOPHORÆ Hopkins, 1915-a, 48.

Oblong, suboval. Dark reddish-brown. Pronotum darker, sides rounded, anterior area with rugosities fine, even, and extending to lateral margin, posterior dorsal and lateral areas shining, with rugosities finer and sparser, extending to base, not punctured. Front narrow, slightly produced, sparsely punctured and with median shining impression and sparsely placed long hairs. Elytra with sides straight from base to middle, faintly rounded to apex, striæ impressed, punctures moderately coarse; interspaces convex, with rows of faint, sparsely placed punctures; declivity oblique, with interspace 1 slightly elevated, stria 1 rather deeply impressed. Male with body oval, clothed with very long hairs; legs exceedingly long, anterior tibiæ scarcely broader; head with front narrow, convex, shining, nearly smooth; pronotum shining with rugosities absent or obscure. Length, female. 2.85 mm.; male, 1.6 mm.

Miami, Fla., in *Rhizophora mangle;* November.

XIII. DRYOCŒTES Eichhoff, 1864. (Gr., "tree" + "cultivated.")

Tarsi with first three joints almost equal, simple; club subglobose and subannulate, obliquely truncate, with or without sutures on posterior face and with one or two procurved sutures on anterior face; thorax less prolonged over the head than usual, almost equally roughly punctate over entire disc; anterior margin smooth; elytra simply convex on declivity, except that the sutural stria is usually impressed; tibiæ strongly serrate; eyes oblong, elliptical, emarginate. Female with front pubescent; male with front broad, subglabrous. The species mine under green bark of logs, stumps and dying trees, especially spruce, birch and cherry.

SYNOPSIS OF SPECIES OF DRYOCŒTES.

a. Antennal club with more or less distinct sutures on posterior face.

b. Pronotum with sides nearly straight, the basal angles not strongly rounded; disc with posterior area distinctly punctured. 971. CARYI.

bb. Pronotum with sides rounded, the basal angles strongly rounded, dorsal area not punctured.

c. Elytral declivity with interspace 1 strongly elevated and stria 1 deeply impressed. 972. GRANICOLLIS.

cc. Elytral declivity with interspace 1 slightly or not at all elevated, and stria 1 slightly or not at all impressed.

d. Pronotum with punctures of posterior dorsal area not extending toward or to side margin; front of female with dense pubescence.

e. Pronotal punctures limited to median dorsal area. 973. BETULÆ.

ee. Pronotal punctures not limited to median dorsal area. 974. LIQUIDAMBARIS.

dd. Pronotum with punctures of posterior dorsal area extending

toward or to the lateral margin; front of female with sparse pubescence. 975. AMERICANUS.

aa. Antennal club without sutures on posterior face.

f. Length not exceeding 2.8 mm. (range 2.3—2.75 mm.) 976. PICEÆ.

ff. Length commonly exceeding 2.8 mm. (range 2.45—3.25 mm.) 977. AFFABER.

971 (——). DRYOCŒTES CARYI Hopkins, 1915-a, 50.

Body oblong, elliptical, ferruginous. Pronotal rugosities fine, densely placed and changing to rugose punctures to base. Front flat, shining, distinctly and evenly punctured and with a few long hairs toward sides, with faint median line. Elytral declivity steep, subconvex, interspace 1 elevated, 2 and 3 flat, striæ with coarse punctures. Female front flattened, slightly more pubescent than in male; declivity more opaque and interspace 1 not so strongly elevated. Length, male, 2.15 mm.

Camp Caribou, Maine, in *Picea* sp., May 25.

972 (9118). DRYOCŒTES GRANICOLLIS Lec., 1868, 162.

Elongate-cylindrical. Ferruginous, sparsely clothed with erect hairs. Head with a few granules and punctures. Thorax longer than wide, densely granulate on the whole surface, scarcely more strongly in front than behind, smooth dorsal line narrow, hardly visible. Elytra with rows of large quadrate punctures; intervals narrow, with single rows of small punctures, sutural stria well impressed; tip obliquely declivous, not flattened, but slightly retuse from the depth of the subsutural furrow. Male with only a few hairs in front; female with front thickly covered with long yellow hairs. Length 2 mm.

Described from the mountains of Sullivan Co., Pa. District of Columbia, rare. (*Ulke.*) West Virginia, mining under green bark on stumps, logs and dying trees of black spruce, adults, March—Sept. (*Hopkins.*) New Jersey, found under bark of chestnut, near roots. (*Chittenden.*) Food plants, *Picea, Castanea, Juglans cinerea.*

973 (——). DRYOCŒTES BETULÆ Hopkins, 1915-a, 50.

Oblong, elliptical. Elytra dark reddish-brown. Pronotum darker and with rugosities fine and regular to base, changing to rather coarse punctures, dorsal punctures rugose, median line obscure except toward base, posterior dorsal area nearly glabrous, anterior area and sides sparsely pubescent. Front broad, flat, densely clothed with long yellow pubescence, longer toward the margins. Elytra with interspaces fine and in distinct rows, striæ not impressed, punctures coarse, declivity steep, shining, flat, interspace 1 broad, slightly elevated, 2 broad, flat, slightly impressed, 3 narrow, faintly elevated, all with a row of granules; strial punctures coarse, faintly impressed; pubescence sparse and longer on declivity. Male, declivity more shining and with less evident granules; front broad, convex, faintly rugosely punctured, slightly impressed and shining, with faint median impression and a few long hairs. Length 2.4—4.5 mm.

Fig. 145. *Dryocœtes autographus* Ratz. A European species. × 9. (After Hagedorn.)

Grant Co., Va., in *Betula* sp.; July 9. New York, Montreal Island. Food plant, *Betula lutea*. (*Swaine.*) Resembles *D. autographus* Ratz. (Fig. 145) in size and sculpture; the principal difference being in the secondary sexual characters, which are rather prominent in *betulæ* and obscure in *autographus*. Male with head more convex in front and with only a few long hairs; female with front slightly depressed and thickly covered with long yellow hairs.

974 (——). DRYOCŒTES LIQUIDAMBARIS Hopkins, 1915-a, 51.

Oblong-elliptical. Color dark reddish. Pronotum with moderately long pubescence on anterior dorsal area and lateral margin, pronotal rugosities fine and extending to base on lateral margin, posterior dorsal area distinctly punctured, becoming rugose toward the basal angle. Front broad, flat, with moderately dense, golden yellow pubescence. Elytra with punctures of interspaces in irregular rows, impressed; declivity shining, steep, flattened, interspace 1 broad, slightly elevated, 2 broad, flat, 3 narrow, each with a row of rather coarse granules; pubescence sparse, not very long, even on declivity. Male, declivity more shining and almost without granules; front broad, subconvex, anterior half flat with faint carina, posterior and lateral margins with a few long hairs. Length 3.4—4.2 mm.

Virginia Beach, Va., in *Liquidambar styraciflua* L.; Nov. 26.

975 (——). DRYOCŒTES AMERICANUS Hopkins, 1915-a, 51.

Oblong, elliptical. Reddish-brown. Pronotum with fine regular rugosities extending to basal angles, median and posterior dorsal areas with coarse punctures extending toward basal angle, dorsal line distinct. Front convex, subgranulate, with a few long hairs and with short anterior median elevated line. Elytral striæ faintly impressed, punctures coarse; interspaces narrow with moderately coarse, irregular punctures; declivity subconvex, interspace 1 faintly elevated, second and third equal in width, not impressed or elevated, each with a row of fine granules, pubescence sparse and moderately long, stria 1 faintly impressed. Male, front very broad, convex, anterior area flattened, shining, with a few hairs; declivity more shining, smoother, striæ less distinctly impressed than in female, but each interspace with rows of faint granules. Length 2.9—4.1 mm.

Cheat Bridge, Randolph Co., W. Va., in *Picea rubens;* September. Steuben and Posey counties, Ind., rare; May 13—June 17; beneath bark of dead tamarack, *Larix laricina* DuRoi in Steuben Co. West Virginia, under bark of dead *Abies excelsa*. (*Pierce.*) Mines under green bark on logs, stumps and dying trees of black and Norway spruce; adults March, May. (*Hopkins.*) Pocono Lake, Pa., August. (*Wenzel.*) This is the eastern North American species heretofore confused with the European species *D. autographus* Ratz. The latter occurs throughout

Europe and Japan and has been reported from northern America, Alaska, H. B. T., Canada, Michigan, New York, New Jersey, Virginia and New Mexico in pine and fir. These references, however, probably relate to *D. americanus*. *P. septentrionus* Mann, Lec., etc., is a synonym of *autographus*.

976 (——). DRYOCŒTES PICEÆ Hopkins, 1915-a, 51.

Oblong, elliptical. Reddish-brown; pronotum and elytra clothed with long, erect hairs, becoming longer toward sides and declivity; front densely clothed with long yellow hairs. Pronotum finely granulate throughout, excepting a faint median line. Elytral striæ not impressed, punctures in approximate rows; interspaces equally punctured, causing the appearance of confused punctures; declivity steep, somewhat flattened, interspace 1 faintly elevated, 2 flat, faintly impressed, each with a faint row of granules, striæ 1 and 2 distinctly punctured. Male, front convex, with posterior median shining space and a few long hairs toward the sides; declivity slightly more impressed, with interspacial granules coarser. Length 2.3—2.75 mm.

North Carolina to Canada, westward to Michigan. Closely allied to *D. affaber* Mann.

977 (9117). DRYOCŒTES AFFABER Mann., 1852, 339.

Oblong. Brown, almost shining, pilose with yellowish hairs. Thorax semi-elliptical, narrowed in front, almost equally roughly granulate, slightly more asperate in front. Elytra feebly striate-punctate, intervals somewhat irregularly punctate, apex obtusely rounded, impressed especially on declivity in subsutural stria. Length 3 mm.

Quebec, Virginia, Lake Superior, Colorado and Alaska, B. C. Food plants, *Pinus*, *Picea* and *Abies*. Bores in terminal shoots of white pine and cones of red pine. (*Pierce.*) *D. piceæ* is distinguished by its smaller size and distribution.

XIV. AMBROSIODMUS Hopkins, 1915-a.

(Gr., "ambrosia" + "eater.")

Joint 2 of funicle as long as 3 and 4 together, 5 much broader; club nearly as broad as long, with sutures on anterior and posterior faces; eyes short, elliptical, emarginate.

SYNOPSIS OF SPECIES OF AMBROSIODMUS.

a. Antennal club with two sutures on posterior face; elytral declivity unarmed. 978. LINDERÆ.

aa. Antennal club with one suture on posterior face; elytral declivity armed.

b. Elytra with strial punctures coarse. 979. LECONTEI.

bb. Elytra with strial punctures fine. 980. TACHYGRAPHUS.

978. (——). AMBROSIODMUS LINDERÆ Hopkins, 1915-a, 56.

Female, body elliptical, light reddish-brown. Pronotum slightly broader than long, sides faintly rounded, anterior margin obtusely

rounded, unarmed, rugosities coarser on the anterior area, becoming finer and sparser to the base, which is more shining. Front flat, opaque, with faint median shining line. Elytra and declivity shining, stria not impressed, punctures fine, in distinct rows; interspaces smooth and irregularly punctured; declivity steep, subconvex, interspace 3 with a few minute granules, apex obtusely rounded, with slightly elevated, subacute margin. Male, body short, stout, reddish-brown, clothed with long, erect hairs, longer on sides. Pronotum darker, subquadrate, one-third broader than long, flattened, opaque, alutaceous, scarcely rugose. Head small, front broader than long, opaque, with faint posterior elevation. Elytra globular, dorsal area broadly rounded from base to apex; declivity convex, broadly rounded from vertex to apex, which is narrowed and retuse, its posterior lateral margin not elevated; striæ in approximate rows but confused on declivity, which is without granules. Length, female, 2.4 mm.; male, 1.85 mm.

Rosslyn, Va., in *Lindera* sp.; May 8. Male reared at Washington, D. C., Sept 30.

979 (——). AMBROSIODMUS LECONTEI Hopkins, 1915-a, 56.

Elliptical, dark, reddish-brown. Pronotum lighter, broader than long, posterior dorsal area subopaque, lateral area shining, becoming smoother and punctured toward posterior angle. Front subopaque, rugosely punctured and with median shining line. Elytral striæ with coarse and rather deep punctures; interspaces narrow and irregularly punctured; declivity convex, faintly impressed to middle, interspace 2 armed with two acute denticles, 3 to 6 granulate, apex obtusely rounded, posterior and lateral margins faintly elevated, smooth. Length, female, 2.85 mm.

Keene, Fla. (*Hubbard & Schwarz*); Haulover, Fla., March 10.

980 (9103). AMBROSIODMUS TACHYGRAPHUS Zimm., 1868, 144.

Brown, antennæ and feet ferruginous-yellow. Prothorax not longer than wide, thinly pubescent, its front obtusely rounded, nearly flat, surface finely rugose to base, the posterior lateral area smooth, shining and punctured. Elytral punctures not deep or very distinct, declivity moderately steep, convex; interspace 1 faintly retuse, nearly smooth, 3 armed with two or three denticles, 4 to 6 roughened with granules. Male, body short, stout, light brown. Pronotum much broader than long, flattened, sides strongly rounded, apical margin faintly retuse, surface shining and very faintly rugose, except toward base which is opaque and with a median marginal obtuse elevation. Elytra globular, broadly rounded from base to apex, strial punctures fine and in faint rows from base to anterior area of declivity; posterior area somewhat flattened, faintly granulate. Male reared Sept. 30 by H. F. Wilson in *Betula* sp. Length, female, 2 mm.; male, 1.95 mm.

Dunedin, Fla., rare; April 1. Described from North Carolina. District of Columbia, boring in *Acer dasycarpum* and other trees on shore of river. Recorded from Pennsylvania, New York, Middle and Southern States. Food plants, *Liriodendron, Acer, Fagus, Cercis* and *Rhus*.

XV. Xyleborus Eichhoff, 1864. (Gr., "wood" + "eat.")

This genus, as restricted by Dr. Hopkins, is distinguished by the 5-jointed funicle, with joint 5 short and broad; club short, broad, anterior face obliquely truncate, with one or two recurved sutures, posterior face without sutures; pronotum longer than broad, with sides parallel or slightly narrowed toward base, apical margin broadly rounded, without serrations; eyes elliptical, emarginate. These insects enter green sap and heart wood of logs, stumps and injured and living trees, mainly hardwood of many species, causing black "pinholes," a serious damage to lumber.

SYNOPSIS OF SPECIES OF XYLEBORUS.

a. Apex of elytra obtuse, with a prominent acute granule each side.
b. Declivity with interspace 1 unarmed, interspace 3 armed with acute granules toward apex. 981. QUERCUS.
bb. Declivity with interspaces 1 and 3 armed with rows of granules.
c. Elytral intervals faintly rugose and subopaque. 982. SAXESENI.
cc. Elytral intervals smooth and shining.
d. Declivity with interspace 2 scarcely impressed. 983. PECANIS.
dd. Declivity with interspace 2 strongly impressed. 984. FLORIDENSIS.

aa. Apex of elytra broadly to subacuminately rounded, without prominent granules or tooth each side of apex.
e. Elytral declivity interspace 1 armed with granules.
f. Declivity opaque, with rows of shining discs in place of strial punctures.
g. Pronotum flat, longitudinally impressed. 985. PLANICOLLIS.
gg. Pronotum convex. 986. INERMIS.
ff. Declivity subopaque, with obscure rows of shallow punctures. 987. AFFINIS.

fff. Declivity shining.
h. Declivity oblique, flattened to subconvex, sublateral margin acute.
i. Declivity flat, strial punctures fine. 988. RILEYI.
ii. Declivity subconvex.
j. Elytra glabrous toward base, striæ indistinct. 989. HUBBARDI.
jj. Elytra sparsely pubescent toward base, striæ distinct. 990. SCHWARZI.

hh. Declivity convex, sublateral margin obtuse.
k. Striæ scarcely impressed, punctures fine. 991. HOWARDI.
kk. Striæ impressed, punctures moderately coarse.
l. Pronotum with subelongate dorsal elevation. 992. FITCHI.
ll. Pronotum with round dorsal elevation. 993. XYLOGRAPHUS.

ee. Elytral declivity interspace 1 unarmed.
m. Declivity shining, apex not obtusely rounded.
n. Declivity subconvex, with two coarser denticles on third interspace. 994. SOLTANI.

nn. Declivity retuse, with 1 to 3 coarse denticles on third interspace.
o. Pronotum convex.
p. Declivity with interspace 1 distinctly elevated and interspace 2 impressed. 995. IMPRESSUS.
pp. Declivity with interspaces 1 and 2 flat, strial and interspacial punctures subequal, subconfused. 996. NYSSÆ.
ppp. Declivity with interspace 1 slightly elevated, 2 flat; punctures of striæ coarse, impressed. 997. FUSCATUS.
oo. Pronotum flat. 998. VIDUUS.
mm. Declivity subopaque, apex obtusely rounded. 999. CELSUS.

981 (——). XYLEBORUS QUERCUS Hopkins, 1915-a, 63.

Oblong-elliptical. Dark brown. Pronotum with sides slightly narrowed toward base, anterior rugosities fine, closely placed, confused; median and posterior dorsal areas glabrous and shining, lateral area subopaque, faintly and closely punctured. Front broad, convex, opaque, with faint median line. Elytral striæ obscure; declivity opaque, faintly broadly impressed; interspace 1 flat, unarmed, 3 not elevated, armed with two or three small granules toward the vertex and one slightly larger toward the apex, posterior lateral margin serrate. Length, female, 1.9 mm.

Baxterville, Mississippi, in *Quercus* sp.

982 (——). XYLEBORUS SAXESENI Ratz., 1837, 167.

"Female elongate, blackish or brownish-piceous, almost shining, thinly clothed with pale pubescence. Thorax oblong, smooth behind. Elytra feebly punctate-striate, intervals uniseriately punctulate, tuberculate behind; apex declivous almost rounded, pruinose; suture and intervals 3 and 4 uniseriately cribrately tuberculate, second subsulcate, smooth. Length 2—2.5 mm. Male shorter, brownish-testaceous, with longer pubescence, convex, subdepressed. Length 1.5 mm." (*Eichhoff.*) "Elytral interspaces faintly rugose and subopaque, declivity with interspace 2 not strongly impressed, and interspace 1 not strongly elevated, punctures of striæ 1 and 2 obscure." (*Hopkins.*)

An introduced European species taken in Mississippi in June with which *X. xylographus* Say has been in part confused by Hubbard and other authors. Hubbard (1897, 24—25) states that the young are assembled in a brood chamber at the end of a gallery penetrating into the heartwood, standing vertically on edge, parallel with the grain, with little more space between its walls than the thickness of the beetle's body. The entire surface of the walls of this chamber is plastered with ambrosia

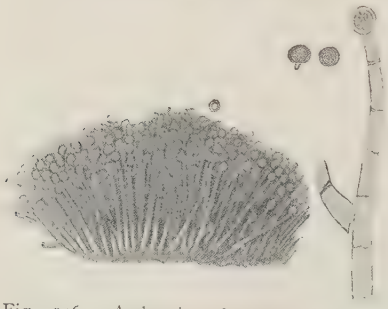

Fig. 146. Ambrosia of *Xyleborus xylographus* Say. Greatly enlarged. (After Hubbard.)

fungus, consisting of short, erect stems, terminating in spherical conidia. (Fig. 146.) Freshly grown it is colorless but usually greenish-yellow, resembling sublimed sulphur. The brood chamber is packed at times with eggs, larvæ, pupæ and adults. The larvæ aid in extending the chamber, the wood passing through their bodies becoming mustard-yellow in color; great quantities of this excrement are ejected from the openings to the colony, but a portion is retained to form a bed for new crops of food fungus. Sometimes the remains of deceased members are found in a deep recess, with the mutilated remains of predatory beetles. This species feeds only in dying trees and generally trunks of large size. Oak, hickory, beech and maple seem to be preferred. It does much injury to timber, and in cut lumber the broad, flat chambers produce defects that cannot be remedied by plugging.

983 (——). XYLEBORUS PECANIS Hopkins, 1915-a, 63.

Oblong-elliptical. Dark reddish-brown. Pronotum with sides parallel, rugosities fine, with small, shining, median elevation and posterior dorsal and lateral areas smooth, shining, glabrous. Front broad, subconvex, opaque, alutaceous, with distinct median line. Elytra shining, with strial punctures fine, in distinct rows; interspaces smooth and shining; declivity opaque, subconvex, with interspaces 1 and 3 not elevated, but with rows of granules, 2 flat, but not impressed and without punctures, posterior lateral margins scarcely serrate. Male, light brown. Pronotum subconvex, anterior area not impressed, with very fine rugosities; body sparsely clothed with erect hairs; front narrow, subopaque. Elytra shining, faintly punctured, declivity oblique; interspaces 1 and 3 faintly elevated, 2 faintly impressed, granules very small. Length, female, 1.9 mm.; male, 1.5 mm.

Waynesboro, Mississippi, in *Hicoria pecan* Marsh.

984 (——). XYLEBORUS FLORIDENSIS Hopkins, 1915-a, 63.

Oblong-elliptical. Yellowish-brown. Pronotum with sides parallel, anterior rugosities fine, with faint dorsal tubercle, median and posterior dorsal areas subopaque, lateral area alutaceous. Front subconvex, alutaceous, with faint median line. Elytra with striæ impressed on dorsal area, punctures coarse; interspaces smooth and shining, faintly punctured; declivity subconvex, interspaces 1 and 3 distinctly elevated, 2 impressed, with strial punctures distinct, posterior lateral margin serrate. Length, female, 2.3 mm.

Enterprise, Florida, May. (*Hubbard & Schwarz.*)

985 (9115). XYLEBORUS PLANICOLLIS Zimm., 1868, 145.

Ferruginous; front smooth and flat. Prothorax almost as wide as long, very finely and thickly punctured, not roughened in front but broadly flattened; disc feebly and broadly sulcate and clothed on anterior half

with fine, silky hairs. Elytra with approximate, ill-defined rows of feeble punctures; declivity flattened in male, with a few small, acute granules; concave in female, with three or four prominent tubercles on the obtusely elevated margin. Tibiæ finely serrate below, coarsely so above, rounded at tip. Funicle of antennæ stout, closely connected with club. Length 2 mm.

Described from Pennsylvania. Known also from Maryland and District of Columbia. Swaine, following Hubbard and Blandford, treats *planicollis* as a synonym of *fuscatus* Eich., and gives the combined distribution as New Jersey to Texas, Guatemala and Columbia, and the food plants as *Quercus, Hicoria, Castanea, Juglans* and *Pinus* (wine and vinegar casks). Hopkins considers *planicollis* as distinct, citing only the type locality, "Pa." The figure of *fuscatus* male in Bull. 7, "Ambrosia Beetles of the U. S.," actually represents this species.

986 (——). XYLEBORUS INERMIS Eich., 1867, 401.

Elongate, cylindrical. Ferruginous-testaceous, shining, sparsely pubescent. Thorax oblong, disc subimpressed on each side, punctulate behind. Elytra faintly uniseriately punctulate with broad interspaces, uniseriately punctulate; apex declivous, depressed, flat, almost smooth, opaque, feebly armed, faintly impressed at suture. Length 2.4—2.6 mm. (*Eichhoff.*) Male, 1.8 mm. long, oblong-elliptical, light yellowish-brown. Pronotum with sides parallel, anterior area broadly impressed, with anterior margin scarcely produced with obtuse subapical tubercles, rugosities fine, extending to median broad elevation, posterior and lateral area shining, faintly punctured. Front convex, subopaque, with anterior median shining space. Elytra with sides parallel to vertex, basal and lateral areas shining, feebly punctured, declivity oblique, opaque, subconvex, striæ with faint shining discs, interspaces 1, 3 and 4 with a few granules, pubescence moderately long; head moderately large. (*Hopkins.*)

Eichhoff's types were from Tennessee and Cuba. Known also from Monongalia Co., W. Va., in *Castanea dentata;* July. Maurer, N. J., May. Delaware Co., Pa., March, in chestnut. (*Wenzel.*)

987 (——). XYLEBORUS AFFINIS Eich., 1867, 401.

Subelongate. Brownish-testaceous, shining, with long gray pubescence. Thorax oblong, disc to middle with obtuse tubercles, almost smooth behind. Elytra cylindrical, very faintly irregularly punctate in rows, sutural stria not impressed; apex obliquely declivous, subdepressed, opaque, first and third interspaces with two remote tubercles, second unarmed, subimpressed. Length 2.4—2.7 mm. Male, thorax excavated in front, apex almost horned at middle; female, thorax cylindrical, convex, apex rounded, entire. (*Eichhoff.*) Male, 2.25 mm. long, oblong-elliptical, light brown. Pronotum broad, anterior area broadly impressed, apex slightly produced into an obtuse tubercle, rugosities evident on anterior

area, dorsal and lateral areas smooth, shining, not punctured. Elytra with lateral and dorsal areas shining, strial punctures moderately coarse, irregular, subconfused, declivity oblique, opaque, interspace 2 faintly impressed, 1 and 2 with rows of granules, pubescence short. (*Hopkins.*)

Type from North America or Cuba ex Schaum collection. Morgantown, W. Va., in *Quercus* sp.; January. Woodbury, N. J., April, in oak stumps. (*Wenzel.*) Mexico, West Indies, Central and South America.

Under the name "*pubescens* Zimm." Hubbard gives the biology of an insect which may be any one of three species, including *affinis*. In this species a solitary female starts the galleries, in each of which five or six eggs are deposited. The young, hatching, feed upon the ambrosia which glistens on the walls like hoar frost. The pupæ are formed lying free in the galleries and in somewhat over a month from the egg the perfect beetles appear. In time, besides the mother, 15 or 20 offspring females have become adult, but only one or two males are commonly found. A second generation may be started, but usually the seasoning of the wood threatens failure of food fungus and the younger females depart to found new colonies in fresher tree trunks. The deserted males sometimes establish bachelor colonies, Eichhoff recording 50 or more packed in a single gallery. The ambrosia of this species has short branching stems, terminated by single spherical conidia; a brown stain accompanies the fungus. Many kinds of trees are attacked, maple, orange, pine, oak and ash being especially mentioned by Hubbard, but he admits difficulty in distinguishing the species. They may be driven by hunger to attack healthy trees, but it is only in the sapwood of dying timber that they succeed in establishing colonies.

988 (——). XYLEBORUS RILEYI Hopkins, 1915-a, 65.

Oblong-elliptical. Dark ferruginous. Pronotum with sides faintly narrowed toward base, posterior dorsal and lateral areas shining and rather distinctly punctured. Front opaque, with faint median line. Elytra moderately shining, with strial punctures very fine, obscure, interspaces flat, faintly and sparsely punctured; declivity shining, subconvex, with interspaces scarcely elevated, 1 and 3 armed with coarse granules, punctures in striæ 1 and 2 evident, posterior lateral margin smooth. Length, female, 2.3 mm.

Capron, Florida, April 25.

989 (——). XYLEBORUS HUBBARDI Hopkins, 1915-a, 65.

Oblong-elliptical. Dark ferruginous. Pronotum elongate, with sides parallel, slightly narrowed toward base, posterior dorsal and lateral areas

shining, scarcely punctured. Front subopaque, with median line. Elytra shining, with strial punctures distinct on dorsal area but obscure on lateral area, interspaces smooth, shining, scarcely punctured; declivity subconvex, shining, granules of interspaces 1 and 3 moderately coarse, interspace 2 flat, with strial punctures obscure; posterior lateral margin faintly sparsely serrate. Length, female, 2.45 mm.

Biscayne Bay, Florida, February 7. (*Hubbard & Schwarz.*)

990 (——). XYLEBORUS SCHWARZI Hopkins, 1915-a, 65.

Elongate-elliptical. Ferruginous. Pronotum elongate, with sides parallel, posterior dorsal and lateral areas shining, scarcely punctured. Front moderately broad, subopaque, with impressed punctures and median shining spot. Elytra shining, with strial punctures fine, but in distinct rows; interspaces flat, with approximate rows of punctures; declivity subconvex, shining, interspace 1 with row of moderately coarse granules, 3 with two or three granules, interspace 2 flat, punctures evident; posterior lateral margins not serrate. Length, female, 2.8 mm.

Key West, Florida, April. (*Hubbard & Schwarz.*)

991 (——). XYLEBORUS HOWARDI Hopkins, 1915-a, 65.

Oblong-elliptical. Dark ferruginous. Pronotum with sides parallel, posterior dorsal and lateral areas shining, scarcely punctured. Front flat, subopaque, with median line. Elytra shining, with strial punctures moderately coarse and in distinct rows, interspaces flat, with row of fine punctures; declivity convex, moderately steep, shining, interspaces 1 and 3 not elevated but armed with rows of granules; posterior lateral margin obtuse, not serrate. Male, body elongate. Pronotum with dorsal area broadly rounded from base to apex, which is slightly produced but without apical tubercles, anterior area slightly flattened but not impressed and with fine dorsal line extending from apical margin to beyond middle; anterior area faintly rugose, posterior dorsal and lateral areas shining and punctured. Elytra slightly narrower than prothorax, with punctures subconfused; declivity convex, moderately oblique, with a few granules, surface rugose, pubescent. Length, female, 2.35 mm.; male 1.95 mm.

Washington, D. C. This and the following species are closely allied to *xylographus* Say, differing especially in the smaller size, the latter varying from 2.5—2.7 mm.

992 (——). XYLEBORUS FITCHI Hopkins, 1915-a, 66.

Oblong-elliptical. Dark reddish-brown. Pronotum with sides slightly narrowed toward base, dorsal tubercles prominent, subcarinate, posterior dorsal and lateral area smooth, shining, faintly punctured. Front convex, subopaque, faintly punctured, with faint median line. Elytra shining, strial punctures fine, faintly impressed, distinct; interspaces with rows of very fine, closely placed punctures; declivity convex, rather steep, with strial punctures moderately distinct, interspaces 1 to 3 flat, armed with a few granules, posterior lateral area obtuse, not serrate. Length, female, 2.45 mm.

Hyslop, Long Island, N. Y., in *Pinus* sp.; July 25.

993 (9110). XYLEBORUS XYLOGRAPHUS Say, 1825, 256; ibid. II, 318.

"Cylindrical, ferruginous, shining, thinly pilose; thorax oblong, deeply punctate behind; elytra deeply punctate-striate, intervals slightly convex, uniseriately faintly punctulate; apex convex, declivity rounded, punctate-striate, shining, suture and third interspace each with single tubercle, second unarmed. Length 2.5 mm." (*Eichhoff.*) As pointed out by Hopkins, this description errs in giving the third interspace as tuberculate, the first only being actually so. In separating *howardi* and *fitchi*, "closely allied to *xylographus*," he defines it by "elytral striæ impressed but not on lateral area, pronotum with *round* dorsal elevation, posterior dorsal area distinctly punctured, elytral punctures moderately coarse, declivity convex, shining, sublateral margin obtuse. Length 2.5—2.7 mm. (Fig. 147, C and D.)

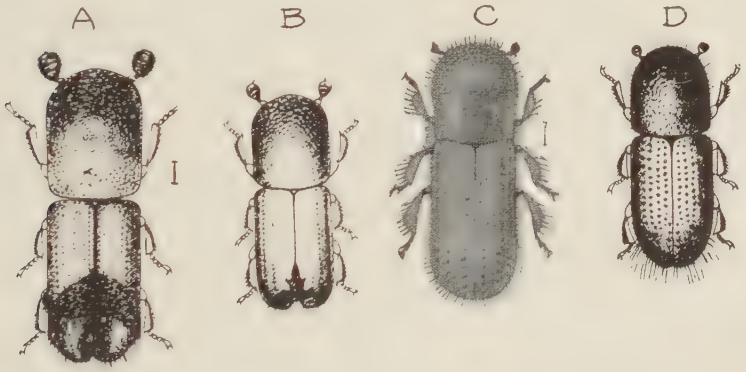

Fig. 147. A, *Monarthrum fasciatum* Say; B, *Monarthrum mali* Fitch; C, *Xyleborus xylographus* Say, female; D, same, male. All much enlarged. (After Hubbard.)

Da Costa, Cape May C. H. and Anglesea, N. J., May—July, on apple, ironwood and other deciduous trees. District of Columbia, abundant on oak. Frequent in southern Indiana, scarce in the northern counties; April 16—Nov. 22. Taken beneath bark of hickory, oak and honey locust. Dunedin and Lake Okeechobee, Florida, March 5—20. Occurs throughout the United States, Canada, Europe and Japan. Food plants, *Pinus, Hicoria, Quercus, Fagus, Acer, Tsuga, Picea, Prunus, Pyrus.*

994 (——). XYLEBORUS SOLTAUI Hopkins, 1915-a, 66.

Oblong-elliptical. Ferruginous. Pronotum with posterior dorsal area smooth, very shining, faintly punctured, lateral area subopaque. Front broad, flat, opaque, scarcely punctured, with faint median line. Elytra shining, with strial punctures very shallow, subquadrate, striæ scarcely impressed; interspaces narrow, smooth, shining, scarcely punctured; declivity moderately steep, faintly impressed, interspace 1 with a few very fine granules, 3 slightly elevated, with two moderately coarse granules, posterior lateral margin faintly sparsely serrate. Length, female, 2.4 mm.

New Orleans, La. (*Soltau.*)

995 (9113). XYLEBORUS IMPRESSUS Eich., 1867, 400.

Elongate, cylindrical. Ferruginous, subopaque, clothed with grayish hair. Thorax oblong, deeply, cribrately punctate behind. Elytra punctate in rows, intervals uniseriately punctate; apex obliquely declivous, at suture subsulcately retuse, with denticles on third interspace distant and acute, the second almost in the middle of the declivity, larger, the third obsolete behind, suture elevated, unarmed. Length 2—2.5 mm. (*Eichhoff.*) "Declivity with two prominent tubercles, and some very indistinct marginal ones, elytra with rows of rather distinct punctures." (*LeConte.*)

Massachusetts, New Jersey and Georgia. Food plant, *Pinus.*

996 (——). XYLEBORUS NYSSÆ Hopkins, 1915-a, 66.

Oblong-elliptical. Dark ferruginous. Pronotum with posterior dorsal area smooth, shining, faintly punctured, median and anterior lateral areas rugose. Front moderately narrow, subconvex, opaque, sparsely punctulate, tuberculate behind; apex declivous, flatly depressed, punctate, irregular; interspaces with impressed punctures, causing the punctures to appear confused; declivity interspace 1 flat, 3 scarcely elevated and with stout submedian granules, posterior lateral margin not serrate. Length, female, 2.4 mm.

Nichols, South Carolina, in *Nyssa* sp.; March 26.

997 (9107). XYLEBORUS FUSCATUS Eich., 1867, 400.

Subelongate, cylindrical. Fuscous ferruginous, shining, with gray pubescence. Thorax subquadrate, sparsely punctulate behind. Elytra paler at base, twice as long as thorax, punctate-striate, intervals uniseriately punctulate, tuberculate behind; apex declivous, flatly depressed, punctate, with a large acute spinule in the middle, distant from suture, second interspace unarmed, impressed. Length 3 mm. (*Eichhoff.*) Male, oblong-elliptical, ferruginous. Pronotum slightly broader than elytra, anterior area broadly and deeply impressed, faintly rugose, anterior margin slightly produced but without distinct tubercles, and posterior lateral area faintly punctured; front narrow, subopaque, with broad and deep triangular impression extending to the vertex, pubescence coarse, moderately long; elytral striæ irregularly punctured in approximate rows; declivity oblique, rugose, interspace 1 unarmed, 2 with one or two acute granules, posterior lateral margins nearly smooth. (*Hopkins.*)

Southern half of Indiana, frequent; April 16—July 23. Sifted from debris of rotten beech. Orange Mts., Ocean County, Woodbury and Five Mile Beach, N. J., April; in roots and stumps of oak. District of Columbia, very common on oak. Sanford, Florida, Jan. 12—March 25. Monongalia Co., W. Va., in *Quercus alba*, March. Ranges from New Jersey to North Carolina (type), Texas, Guatemala and Columbia. Food plants, *Quercus*, in bark. (*Packard.*) *Hicoria, Castanea, Juglans cinerea, Pinus*, (wine and vinegar casks). (*Swaine.*)

998 (——). Xyleborus viduus Eich., 1878, 391.

Described from male, locality doubtfully Brazil, the type received through Kraatz from Germar, possibly of North American origin. Differs by pronotum flat, anterior area not rugose but clothed with fine pubescence, posterior area shining, distinctly punctured; elytral striæ obscure, interspaces rugose; declivity with interspace 3 armed with three coarse granules. Length 2.5 mm.

Included by Hopkins as North American, on specimens from Florida and District of Columbia; not mentioned in Swaine's catalogue.

999 (9106). Xyleborus celsus Eich., 1867, 400.

Sublinear, cylindrical. Brownish-testaceous, shining, with pale pubescence. Thorax oblong, faintly punctate behind. Elytra feebly punctate-striate, fourth interval broader, almost biseriately punctate behind, others uniseriately punctate, apex truncate, retuse, flat, smooth, with four larger teeth near suture and smaller granules near edge of declivity. Length 4.5 mm. (*Eichhoff.*) Male, oblong-cylindrical, ferruginous. Pronotum with sides subparallel, subacuminate to apex, which is obtusely produced, anterior area flattened, faintly impressed, rugosities fine, posterior and lateral areas smooth, shining. Front subopaque, with median shining impression. Elytra with strial punctures obscure, irregular, dorsal area rugosely punctured toward vertex; declivity steep, flat, shining, with interspace 1 broad and flat, armed with two teeth toward middle and one on vertex, interspace 3 forming the lateral margin with three or four small granules, posterior lateral margin obtuse, not serrate. Length, male, 2.7 mm.

Lawrence, Crawford and Posey counties, Ind.; May 23—Sept. 8. Orange Mts. and Da Costa, N. J., June, at light and breeding in hickory. Upper Darby, Pa., October, chopped from dead hickory six or seven inches below surface. (*Wenzel.*) District of Columbia and Morgantown, W. Va., in *Hicoria*. The adults excavate long, branching galleries in dying trees and logs of hickory; bores in oak bark. (*Packard.*)

This, according to Hubbard, is the largest American species, and is found only in hickory. The galleries have a short entrance passage, from the end of which radiate numerous branches, penetrating deeply into the heartwood and promoting decay. The galleries are blackened as if by fire. The ambrosia consists of club-shaped stems, growing upright in dense clusters, tinged at base with an umber brown discoloration. The young and adults live socially in the galleries and the pupæ are formed lying free in the passages. The male was described by LeConte under the name *biographus*.

XVI. Anisandrus Ferrari, 1867. (Gr., "unequal" + "sex.")

Joint 5 of funicle much broader than 2; club oblong-oval, posterior half of anterior face cylindrical and chitinous, anterior half obliquely truncate, posterior face chitinous throughout, without sutures; pronotum broader than long, anterior margin broadly rounded and serrate; eyes oblong-elliptical, deeply emarginate. The stouter form of body and longer and more slender scape also help in separating from *Xyleborus*, the minute and humpbacked males being very peculiar.

SYNOPSIS OF SPECIES OF ANISANDRUS.

a. Pronotum with posterior area shining. 1000. ZIMMERMANNI.
aa. Pronotum with posterior area opaque, alutaceous.
b. Pronotum with sides and basal angles not strongly rounded.
c. Declivity with lateral acute margins not armed.
d. Dorsal area of pronotum more distinctly punctured. 1001. MINOR.
dd. Lateral area of pronotum more distinctly punctured. 1002. SAYI.
cc. Declivity with lateral acute margin armed. 1003. OBESUS.
bb. Pronotum with sides and basal angles strongly rounded. 1004. PYRI.

1000 (——). Anisandrus zimmermanni Hopkins, 1915-a, 68.

Female, short, elliptical. Dark brown, shining. Pronotum with anterior rugosities extending to middle and lateral margin, posterior dorsal and lateral areas smooth, shining, not punctured, posterior lateral margin acute, anterior margin serrate. Front convex, shining, with faint median carina, sparsely punctured. Elytra with striæ not impressed, faintly and closely punctured; interspaces smooth, shining, not punctured; declivity convex, smooth, shining, striæ not impressed, punctures distinct, posterior lateral margin acute, very faintly serrate. Male, light brown. Pronotum much broader than elytra, quadrate, shining, faintly rugose on the anterior lateral areas, anterior margin with apex faintly produced; front narrow, flat, smooth, shining. Elytra narrower than pronotum, with sides rounded and narrowed from base to apex, declivity oblique, convex from near base to apex, subopaque and rugosely punctured, base smooth and shining, pubescence to declivity short, sparse, erect. Length, male, 0.82 mm.; female, 1.5 mm.

Biscayne Bay, Florida. (*Hubbard & Schwarz.*)

1001 (——). Anisandrus minor Swaine, 1910-a, 164.

Female, front convex, punctured, sparsely hairy, with epistomal fringe, median carina very faint. Pronotum from above, slightly wider than long, truncate behind, slightly rounded on sides, broadly rounded in front; asperate in front, sparsely punctured behind, with faintest trace of median carina, sparsely hairy. Elytra hairy, rows of punctures slightly

impressed, noticeably so on the declivity; punctures of the rows more widely spaced than in *dispar*, usually separated by more than their own diameters; interspaces wide, with irregular, very fine punctures replaced by minute granules behind; seventh ridged behind and forming, as in *dispar*, the ventral margin of declivity, but with a few acute granules. Male, front sparsely punctured and with long hairs; carina slightly developed; epistomal fringe longer and thinner than in *obesus* Lec. Pronotum with asperations sparse but well developed, caudal half punctured as usual, smooth median space absent, outline from above broadly rounded in front and behind, sparsely hairy. Length, female, 2.2—2.5 mm.

Montreal Island, Canada, in *Betula* sp.; also St. Hilaire, Quebec, Ithaca, N. Y., Kennedy, W. Va. Fulton Co., N. Y.; June 23. Closely allied to *sayi* Hopkins.

1002 (——). ANISANDRUS SAYI Hopkins, 1915-a, 68.

Female, body short, elliptical. Elytra dark brown. Pronotum black, rugosities extending to middle but not to side margin, sides scarcely rounded, anterior margin broadly rounded, apex with two closely placed small teeth, posterior dorsal and lateral areas opaque, punctures obscure on dorsal, more evident on lateral area, basal angles with margin subacute. Front convex, opaque, alutaceous, with faint anterior line and sparse punctures. Elytra shining, pubescent, striæ not impressed; punctures distinct, shallow and rather closely placed; interspaces with fine irregular punctures; declivity convex, subopaque, nearly smooth, with striæ faintly impressed, punctures coarse, interspaces with a few minute granules; posterior lateral margin acute, slightly produced, but without marginal teeth or granules. Male, body oval, light yellowish. Pronotum subconvex, much narrower than elytra, sides rounded from base to apex, anterior margin broadly rounded, acute-edged, anterior area faintly rugose, posterior smooth, shining. Strial punctures fine and in approximate rows, interspaces faintly punctured; declivity oblique, subconvex, somewhat flattened toward middle, pubescence short. Length, female, 2.8 mm.; male, 1.2 mm.

Morgantown, West Virginia, in sassafras; September 21.

1003 (9105). ANISANDRUS OBESUS Lec., 1868, 159.

Short and stout, cylindrical. Blackish-brown, thinly clothed with long, soft erect pale hairs, antennæ reddish-brown. Head convex, coarsely but not densely punctured. Prothorax rather broader than long, strongly roughened with subacute tubercles in front, nearly smooth behind. Elytra with rows of rather distant punctures, intervals flat, marked with small, distant punctures from which proceed the long hairs; tip obliquely declivous, not tuberculate, but with the striæ somewhat impressed and side and tip acutely margined. Length 3 mm. (*LeConte.*) Elytral declivity with lateral acute margins armed with teeth. (*Hopkins.*)

Canada to Virginia. Hopatcong and Lakewood, N. J. Ontario, Canada, in freshly cut maple stumps. (*Hubbard.*) Food

plants, *Quercus, Fagus, Tsuga, Pyrus. X. serratus* Swaine (1910-a, 162) is evidently synonymous. (*Hopkins.*)

1004 (9104). ANISANDRUS PYRI Peck, Mass. Agr. Journ., IV, 1817, 205.

Shining black, antennæ, tibiæ and tarsi ferruginous-yellow. Prothorax covered in front with sharp tubercles arranged in transverse rows, behind nearly smooth, the whole surface thinly covered with fine white hairs. Elytra punctate-striate, obliquely flattened behind, the intervals finely punctured and pubescent, the seventh acutely elevated toward the tip, the elevations forming the acute margin of the declivity. Length, female, 2.7—3.2; male, 2—2.1 mm.

Massachusetts, Pennsylvania. Orange Mts., Anglesea and Jamesburg, N. J., May, cut from birch shoots. (*Wenzel.*) District of Columbia, in apple. (*Ulke.*) Swaine (uniting *dispar* and *pyri*) gives the distribution as Canada, Eastern and Middle United States, Europe, Asia Minor and Siberia; and food plants, fruit trees, *Betula, Fagus, Quercus, Tsuga*, and in Europe, many others. This species has a habit, shared according to Hubbard by *obesus* and *tachygraphus*, of making circular galleries in small branches of healthy trees, encircling the pith and perpendicular brood chambers which ascend or descend from the main gallery parallel with the grain of the wood. Branches thus girdled are killed beyond the point of attack. Pears and apples suffer from its attacks from Nova Scotia southward. It also girdles young trees of many kinds which have been injured by fire.

The females of the European species, *dispar* Fab. (1792, 363) are scarcely to be distinguished from those of *pyri*. The epistoma (mounted in balsam) is emarginate in the middle, while that of *pyri* is sinuate. The males of *dispar* are larger than those of *pyri*, the striæ are more deeply impressed and the interspaces have more or less regular rows of small punctures. Length, *dispar*, female, 3.2—3.7 mm.; male, 2—2.2 mm.

Tribe II. IPINI.

Pronotum and elytra clothed with scales or hairs, very rarely glabrous; abdominal sternite 7 with posterior margin rarely rounded; anterior tibiæ broader toward apex or serrate on outer margin; pronotum with anterior dorsal area commonly rugose, posteriorly more or less smooth; head concealed from above; anterior tarsi with joint 3 simple.* (Fig. 139, B.)

*In this and the remaining tribes the results of Dr. Hopkins' studies are only partially published; some changes in classification and the descriptions of some new species will therefore appear later in the publications of the Department of Agriculture and should be consulted by the student, our aim being to present only the data published up to April, 1916.

SYNOPSIS OF GENERA OF IPINI.

a. Base of thorax margined; declivity alike in both sexes. I. PITYOPHTHORUS.

aa. Base of thorax not margined; declivity with larger teeth in male.

b. Antennal club not pubescent on both sides. II. PITYOGENES.

bb. Antennal club pubescent both sides. III. IPS.

I. PITYOPHTHORUS Eichhoff, 1864. (Gr., "pine" + "destroyer.")

As defined by Hagedorn, this genus includes those species in which the funicle is 5-jointed; antennal club with sutures (Fig. 137 C.); thorax longer than wide, unequally sculptured, roughened in front, more or less smooth behind, its base bordered by a fine raised line; elytra cylindrical, feebly sculptured, usually retuse at declivity, alike in the two sexes. The species are small (2 mm. or less) beetles, for the most part infesting terminal twigs of a variety of trees; the males are often provided with a conspicuous tuft of yellow hair on front of head, found also in some species of *Pityogenes*.

SYNOPSIS OF SPECIES OF PITYOPHTHORUS.

a. Male with dense brush of long yellow hair on front of head (except *consimilis*).

b. Elytral punctures confused, not in distinct rows.

c. Elytral punctuation fine, surface pubescent.

d. Elytral pubescence dense on declivity.

e. Pubescence sparse on basal area, denser on declivity, always hair-like. 1005. MINUTISSIMUS.

ee. Pubescence moderately dense on basal area, denser on declivity, always scale-like. 1006. PRUINOSUS.

dd. Elytra thinly clothed with short, erect, gray hairs. 1007. PUBERULUS.

cc. Elytra strongly punctured, pubescence sparse, long and erect. 1008. PULICARIUS.

bb. Elytral punctures arranged in more or less distinct rows.

f. Thorax smooth in posterior area. 1009. TOMENTOSUS.

ff. Thorax more or less punctate in posterior area.

g. Thorax finely and sparsely punctured in posterior area; asperities of anterior area arranged in more or less concentric rows.

h. Declivity of elytra flattened and retuse.

i. Asperities in sharply raised concentric lines; declivity broadly sulcate, retuse, its suture and elevated margin subtuberculate. 1010. CONCENTRALIS.

ii. Asperities less marked.

j. Margin of declivity sparsely crenate. 1011. CONSIMILIS.

jj. Margin of declivity simple. 1012. ANNECTENS.

hh. Declivity not flattened or retuse. 1013. SERIATUS.

gg. Thorax coarsely or rugosely punctate behind.

k. Declivity of elytra more or less concave.
l. Margin of declivity crenate or tuberculate.
m. Declivity retuse, deeply concave, margins crenate. 1014. PULCHELLUS.
mm. Declivity slightly retuse, broadly concave, margin with three or four inequalities. 1015. PUSIO.
ll. Margin of declivity simple.
n. A patch of thick yellow silky hair each side of thorax. 1016. COMATUS.
nn. Thorax without patch of hair. 1017. LAUTUS.
kk. Declivity feebly or not concave.
o. Declivity feebly concave. 1018. OBLIQUUS.
oo. Declivity not retuse or concave. 1019. OPACULUS.
aa. Male without brush of hair on front of head.*
p. Elytra strongly punctured, partly in rows; declivity strongly retuse, a few asperities on elevation, suture deeply impressed on declivity. 1020. CARINICEPS.
pp. Elytra with regular rows of coarse punctures; declivity hardly retuse. 1021. CONIPERDA.

1005 (9062). PITYOPHTHORUS MINUTISSIMUS Zimm., 1868, 143.

Cylindrical, slender. Black, antennæ and feet pale brown; front of male clothed with long yellow hairs. Thorax roughly tuberculate in front, smooth and shining behind. Elytra clothed with a fine, short gray pubescence; behind obtusely rounded, without tubercles. Male, head deeply concave, edges of concavity fringed with long, yellow, silky hairs. Female, head punctured, slightly hairy. Length 1.6—1.8 mm.

Starke Co., Ind., rare; May 6—9. Ranges from Quebec and New England to Michigan and Florida. Infests black-jack and chestnut oaks and dogwood. In West Virginia this species enters green and dead bark on injured and dead branches and tops of trees, causing slight, if any damage. (*Hopkins.*) Throughout New Jersey, in oak twigs; adults may be cut out any time during the winter. (*Smith.*) District of Columbia, under oak bark. Florida under oak bark in June. Felt (1905) mentions the great numbers of this species at Manor, N. Y., Oct. 3, mining the bark of piled red oak cord wood, probably cut the preceding winter. It runs its galleries transversely to the bark fibre, depositing eggs on either side, the young hatching therefrom work at nearly right angles to the parental grooves. The synonymy of *pusillus* Harris is stated by Eichhoff.

*The last two species indicate a separate genus by the male characters (for which see descriptions below) alone, for which no names are here supplied to avoid conflict with unpublished descriptions of Dr. Hopkins. Some species heretofore cited as *Pityophthorus* will be found elsewhere, e. g. *pullus* in *Pityogenes*, *hispidulus* in *Hypothenemus*, etc. The following species cited in Smith's New Jersey List are undescribed, viz., *bellus*, *fagi* and *frontalis*. The entire arrangement of the genus is provisional, based solely on published descriptions, and will be superseded by the Department of Agriculture publications later.

1006 (11,244). Pityophthorus pruinosus Eich., 1878, 198.

Subelongate, cylindrical. Piceous or brownish-ferruginous. Thorax oblong-ovate, behind finely punctulate. Elytra finely punctulate, densely clothed with short gray hairs, apex almost deplanate, suture subsulcate on each. Male, front surrounded with very dense convergent yellow hairs. Female, front sparsely clothed with gray hair. Length 2 mm.

Described from Carolina. Synonymous with this species is probably *Pityophthorus quercicerda* Schwarz,* which has been recorded from Peekskill, N. Y., on felled oak (*Sherman*); Hemlock Falls, N. J., rare; Florida under oak bark in June. It occurs in red oak, making primary galleries, partly in the bark and partly in the outermost layer of the wood, which exhibit peculiar features; the female bores straight through the bark, then follows a very short gallery vertically downward, which is crossed immediately below the entrance hole by an extremely long transverse gallery.

1007 (9082). Pityophthorus puberulus Lec., 1868, 157.

Cylindrical, moderately slender. Black, thinly clothed with short erect gray hairs. Head slightly convex, punctulate. Thorax a little longer than wide, slightly narrowed in front, feebly rounded on the sides, broadly rounded at base and more strongly at tip, with reclinate tubercles in front of middle, strongly but finely punctured at sides and behind. Elytra about one-half longer than thorax, strongly but finely punctured, but not in rows; posterior declivity not at all flattened, slightly convex, with a well marked sutural stria extending from tip one-third the length of elytra, tip of suture slightly acute, but not acuminate. Somewhat resembles *minutissimus* in form but smaller and much less finely punctured and narrower. LeConte adds: "Easily distinguished by absence of fringe of long hair on head," but doubtless drew his description from female. Length less than 1.5 mm.

District of Columbia, Michigan, Ontario, New Jersey, Pennsylvania; April—Aug. Infests dying terminal twigs of pine; West Virginia, mining under bark on dead trees; adults, July. (*Hopkins.*) Perfect clouds of this insect were seen at Lake Superior in 1876 on a tract of burned white pine land. (*Schwarz.*) *P. infans* Eich. is a synonym.

1008 (9070). Pityophthorus pulicarius Zimm., 1868, 144.

Brown or ferruginous, antennæ and feet yellow. Head thickly punctured, with a slight impression upon the front; joints 2 to 5 of funicle closely connected, forming a pedicel to the club; anterior margin of male thickly fringed with long yellow hair. Thorax somewhat longer than wide, roughly tuberculate in front, thickly and finely punctured behind;

*Proc. Ent. Soc. Wash., I, 56.

elytra strongly punctured, but not in rows, impressed along the suture behind middle, the tip rounded. The form is stouter, size much smaller, punctures coarser than in allied species. (*LeConte.*) Length 1—1.5 mm.

Tybee Island, Ga., June, July. (*Wenzel.*) Lake Okeechobee, Fla., March 8. Illinois, South Carolina. Ranges from New Jersey to Florida in the coastwise states, June, August. Breeds in pine twigs.

1009 (——). PITYOPHTHORUS TOMENTOSUS Eich., 1878, 201.

Oblong, subelongate. Piceous, almost shining, thinly pubescent with very short hairs. Thorax oblong-ovate, almost constricted in front, smooth behind. Elytra smooth, obliquely deplanately subretuse at apex. Male, front densely clothed with yellow hair at sides. Length 1.5 mm.

Described from North America. Placed by Eichhoff next to *pusillus*.

1010 (11,242). PITYOPHTHORUS CONCENTRALIS Eich., 1878, 188.

Elongate. Ferruginous-testaceous, almost shining, sparsely clothed with grayish hair. Thorax oblong, narrowed in front, almost constricted, front part with elevated tubercles concentrically arranged, behind sparsely feebly punctate. Elytra from base to apex almost equally deeply punctato-striate, intervals narrow, impunctate; declivity as described in key. Closely allied to *P. consimilis;* differs in the sharply raised concentric lines on anterior part of thorax. Length 1.5 mm.

Biscayne Bay, Fla., under bark of *Rhus*. Abundant in semitropical Florida on poison-wood (*Rhus metopium*). (*Schwarz.*) Described from Cuba. By the co-operation of several parent beetles a large central chamber of irregular outline is excavated under the thin bark of the trunk or larger branches; several (two to five) more or less undulating primary galleries radiate therefrom, the eggs being deposited singly in little indentations. The larval galleries are short, either diverging in the usual way or frequently intersecting each other, or even reverting to the central chamber.

1011 (9076). PITYOPHTHORUS CONSIMILIS Lec., 1878, 622.

Yellow-brown, shining, with a few erect yellow hairs; elongate-cylindrical, of the same form and sculpture as *P. annectens*, except that the obtuse elevation of apical declivity of elytra, and the corresponding part of suture are sparsely crenate; antennæ and legs yellow, form a trifle more robust. Male, head flat, slightly pubescent, with a large, subquadrate, densely punctured opaque spot occupying nearly the whole upper surface and divided by a longitudinal impressed line; sides shining, sparsely punctured. Female, head slightly convex, strongly punctured. Length 1.6 mm.

Michigan. Described from Marquette and Detroit, Mich. Ranges from Quebec and New York to Florida. Mines under green bark on dying sumac; adults, June–November. (*Hopkins.*) Infests sumac, *Rhus glabra*, and poison ivy, *Rhus toxicodendron*, primary galleries starting from a central chamber, but usually following the longitudinal axis of the vine; the larval galleries crowd and intersect each other so that the whole bark near the central chamber is undermined. The oblique galleries of this species in sumac are familiar and characteristic, but of little importance except when the carved branches are utilized in rustic structures. Ashmead has described a parasite (*Cerocephala pityophthori*) reared from this species, with the assigned locality Haw Creek, Fla. The females of this and the next species are difficult to distinguish but the males differ in pubescence of head. In *annectens* male the pubescence is yellow, very long, forming a circular fringe and usually concealing the sculpture. In *consimilis* male the pubescence is much shorter, of grayish color, sparse anteriorly and more brush-like on posterior part of head.

1012 (9075). PITYOPHTHORUS ANNECTENS Lec., 1878, 622.

Elongate-cylindrical. Brown, shining, with a very few slender, erect, scarcely serrate yellow hairs. Thorax longer than wide, in front roughened almost concentrically for about one-third the length, sides and base finely sparsely punctured, punctures becoming larger as they approach the roughened surface. Elytra with approximate rows of small punctures, intervals transversely rugose; apical declivity retuse, deeply impressed near suture, which is elevated, sutural tip rather acute; front tibiæ with two small teeth. Male, head broadly concave, opaque with shallow punctures, concavity fringed with long yellow hairs. Female, head slightly convex, strongly and deeply punctured. Length 1.6 mm.

Tampa, Fla., on yellow pine. District of Columbia, on pine. "I fully believe that *P. annectens* will prove to live exclusively on *Pinus palustris* and allied species." (*Schwarz.*)

Doubtfully referred to this Floridian species is a species found by Fitch under the bark of small sapling pines and by Packard (1890) under bark of white pine at Providence, R. I. Fitch supposed it to be *P. pusillus* Harris, (a name since replaced by *minutissimus*) and was so impressed by the intricacies of its work as to write: "How wonderful is nature, that thus presents an interesting subject for our study in each particular track an inch or two in length which a family of little worms make as they eat their way along in the bark of a tree."

1013 (9085). PITYOPHTHORUS SERIATUS Lec., 1878, 433.

Elongate, cylindrical. Brown, shining, nearly glabrous, with only a few scattered, erect hairs on the head, front of thorax and hind part of

elytra; antennæ and legs testaceous. Head flat, opaque, indistinctly punctulate, front feebly impressed and indistinctly carinate. Prothorax quadrate, not longer than wide, rounded in front, anterior half with irregular transverse, subconcentric rows of granules, sides and base sparsely but distinctly punctured. Elytra with striæ composed of small punctures; intervals wider than striæ, alternate ones with four or five distinct punctures of equal size with those of the striæ; sutural stria slightly impressed. Front and middle tibiæ not serrate, hind tibiæ with three or four very indistinct traces of teeth and no range of spines or fringe of stiff hairs as in *P. obliquus*. Length 1:5 mm.

Tampa, Fla., April, one specimen. Occurs on pine. (*Schwarz.*)

1014 (9069). PITYOPHTHORUS PULCHELLUS Eich., 1868, 275.

Subelongate. Black, shining, almost glabrous. Thorax shortly ovate, dilated toward base, in front almost equally rounded, narrowed, strongly rugosely punctate behind, asperate with tubercles in front. Elytra cylindrical, narrower than thorax, striato-punctate; intervals distantly uniseriately punctate, retuse behind and sulcate, the elevated suture and lateral margin with a single row of granules, setose, sutural apex almost acuminate. Length 1.5 mm.

Described from North America; *the first of the genus to be described*. Known from Michigan, Pennsylvania, District of Columbia and West Virginia. Food plants, *Pinus* and *Picea*. Eichhoff (1896) states that *P. hirticeps* Lec. (1878, 623), described from Marquette, Lake Superior, "is extremely close to, perhaps identical with *P. pulchellus*," and we have included its recorded distribution with that of the latter species.

1015 (9080). PITYOPHTHORUS PUSIO Lec., 1878, 623.

Cylindrical. Shining, piceous, with a few erect yellow hairs behind middle of elytra. Prothorax not longer than wide, roughened in front almost to middle, strongly and densely punctured at sides and behind, with a large, smooth, well defined dorsal space. Elytra with small punctures, arranged in tolerably regular rows; declivity as described in key, and with about three very small teeth; suture elevated, also with three or four slight inequalities. Front tibiæ with two very faint small teeth. Size and form of *P. pulicarius*, differs in elytral sculpture and declivity with sparse crenations. Length 1.6 mm.

Described from Marquette, Michigan.

1016 (9086). PITYOPHTHORUS COMATUS Zimm., 1868, 143.

"Brown, antennæ and legs yellow; front clothed more or less thickly with silky hairs. Prothorax longer than wide, roughly tuberculate in front, ornamented each side with a patch of thick yellow silky hair; elytra very finely but distinctly punctate-striate, obtusely rounded at tip and without tubercles. Length 1.8 mm." (*Zimmerman.*) The specimen is a male and has the head nearly smooth, broadly and deeply concave, thinly fringed

with not very long yellow hair. Easily recognized by the large elliptical patch of yellow hair each side of prothorax and fine distant rows of elytral punctures. Declivity not retuse, sutural stria deeply impressed. Club of antennæ divided by three distinct sutures." (*LeConte.*)

Described from South Carolina. Eichhoff (1878) copied the Zimmerman description, since which time no reference to the species appears in literature.

1017 (9081). PITYOPHTHORUS LAUTUS Eich., 1871, 135.

Subelongate. Ferruginous, almost shining, grayish-pubescent. Thorax narrowed and asperate in front with tubercles and rugæ concentrically arranged, deeply coarsely punctate behind. Elytra rugulose, deeply punctate-striate, each deeply sulcate at apex, suture more strongly elevated. Asperities of thorax arranged in four or five transverse rows, punctures of the rows of the elytra larger, rows better defined, declivity retuse and deeply sulcate along suture. Length 1.6 mm.

West Virginia, mining under bark on injured branches and twigs; infests pine; adults, June, July. (*Hopkins.*) Texas.

1018 (9084). PITYOPHTHORUS OBLIQUUS Lec., 1878, 422.

Cylindrical, not slender. Dark brown, shining, thinly clothed with fine long, erect pubescence; antennæ and legs ferruginous. Head flat, opaque, indistinctly punctulate. Prothorax quadrate, scarcely longer than wide, broadly rounded at apex, anterior one-fourth covered with obtuse granules, not arranged in concentric lines, gradually changing behind into fine, rugose, sparse punctuation. Elytra finely punctured, punctures arranged in approximate rows which in places are indistinct, apical declivity flattened, feebly convex each side of sutural stria, which is not very distinct; there are also traces at the apex of two other striæ. Front and middle tibiæ not toothed, hind tibiæ with a marginal row of 7 or 8 small acute spines, and a fringe of stiff long hairs. Length 2 mm.

Enterprise, Florida, June. One specimen.

1019 (9087). PITYOPHTHORUS OPACULUS Lec., 1878, 623.

Cylindrical, slender. Testaceous, head and disc of prothorax darker, legs and antennæ yellow. Head punctured. Anterior half of thorax rather strongly asperate, sides and posterior half subrugosely punctulate, dorsal line smooth, narrow. Elytra finely alutaceous, nearly opaque, marked with scarcely perceptible distant striæ of very fine punctures; apical declivity neither retuse nor concave, suture elevated, limited by a distinct stria. Length 1.3 m.

Described from Marquette, Michigan.

1020 (9071). PITYOPHTHORUS CARINICEPS Lec., 1876, 353.

Rather slender, cylindrical. Blackish-piceous, shining, pubescence fine, sparse and erect, antennæ and legs yellow-brown. Club transversely annulated with curved sutures, outer part of funicle indistinctly divided

into four parts. Head of male finely punctured, opaque, with two very deep excavations, extending almost to the front margin, and separated by a narrow, elevated longitudinal carina; eyes deeply and narrowly emarginate. Thorax longer than wide, anterior half densely asperate, separated from posterior half by a shallow transverse impression, posterior half shining, distinctly but not densely punctured, smooth dorsal line not elevated, base distinctly margined. Elytra and declivity as described in key; suture slightly impressed and marked with a row of punctures as far as declivity, where it becomes smooth and deeply impressed, concavity smooth, broader at tip; tibiæ with two or three feeble teeth toward tip. Length 2.5 mm.

Michigan, Ontario, Pennsylvania. Western Maine to West Virginia in terminal twigs of spruce, excavating many short, radiating, curved galleries from a large central chamber in the bark and surface of the wood of twigs and branches of dying trees, and main stem of young dying red spruce. (*Hopkins.*) Evidently a northern species and thus far quite rare; at Ithaca, N. Y, under bark of small twigs of white pine, *P. strobus*; Aug. 21 and October. (*Chittenden.*)

1021 (——). PITYOPHTHORUS CONIPERDA Schwarz, 1895, 144.

Cylindrical, less elongate. Shining, sparsely beset with rather long, erect and serrate hairs; black, mouth parts, antennæ and tarsi reddish-testaceous, tibiæ often reddish. Antennal scape straight, gradually thickened apically, funicle 5-jointed, club large, ovate, on both sides shining and sparsely pubescent, fringed with moderately long hairs, sutures nearly straight, dividing it into three nearly equal parts. Head very shining, with but a few hairs in both sexes; eyes large, acutely emarginate in front. Thorax almost as wide as long, narrowed apically, anterior half tuberculate, posterior half densely punctured, more densely hairy than head. Elytra with sparse, long, erect pubescence; first and second intervals very sparsely, uniseriately punctured, the others with regular series of punctures; declivity moderately steep, not sulcate, traversed by a fine, elevated subsutural stria, which is either crenulate or slightly tuberculate, and limited externally by a tuberculated ridge which is the continuation of the second interval. Male, head smooth, except scattered punctures near the eyes, and with a flattened tubercle on the clypeal margin, which is continued posteriorly as a feeble ridge. Female, head with small scattered punctures which become stronger and denser at sides. Length 2.7—3.3 mm.

Canada, Michigan, Massachusetts, Virginia, New York, Pennsylvania; June, July, November. Develops within the cones of pine trees. Synonymous with this species appears to be *Dryocœtes* sp. Hamilton,* which breeds in cones of *Pinus strobus*, which normally grow to a length of six or seven inches; eggs probably deposited in young cones which, from impaired vitality, drop when three or four inches long, full grown larvæ found in July; adults found Sept. 10.

*Can. Ent. XXV, 1893, 279.

1022 (——). PITYOPHTHORUS TUBERCULATUS Eich., 1879, 498.

A species found in West Virginia, mining under bark of terminal twigs on young black spruce, Oct. 28, was determined by Eichhoff as identical with this California species.

II. PITYOGENES Bedel, 1888. (Gr., "pine" + "bearded.")

This genus contains a few species now separated from *Pityophthorus* by the teeth of the elytral declivity being much larger in male than in female, while in both sexes the base of the prothorax is without the fine raised line that borders it in the older genus. (Fig. 137, A.) They bear a deceptive resemblance to *Xyleborus* and were all described in that genus by LeConte.

SYNOPSIS OF SPECIES OF PITYOGENES.

a. Declivity of elytra oblique, not sharply margined.
b. Declivity not punctured.
c. Elongate smooth dorsal space each side of thorax. 1023. HOPKINSI.
cc. Faint smooth dorsal carina at middle of thorax. 1024. PULLUS.
bb. Declivity punctured. 1025. PUNCTIPENNIS.
aa. Declivity of elytra nearly perpendicular. 1026. PLAGIATUS.

1023 (9068). PITYOGENES HOPKINSI Swaine, Tech. Publ. N. Y. Coll. For., 1915, 8.

Fig. 148. × 24. (After Blackman.)

Elongate-cylindrical. Blackish-brown, shining, sparsely clothed with very long, erect hairs; antennæ and feet dark ferruginous; head densely pilose, with long yellow hair in male. Prothorax a little longer than wide, coarsely asperate in front, coarsely and sparsely punctured behind, anterior margin fringed with hairs which are half as long as thorax. Elytra with rows of distant coarse punctures, intervals with more distant but equally coarse punctures; tip obliquely declivous, impunctured, except in subsutural furrow, which is well marked; face of declivity each side with two large acute tubercles, and a third smaller one at upper edge of slope, margin of slope with three or four small denticles; extreme tip slightly produced into an acute point. Tibiæ with only a few small teeth, front pair narrower than others. Easily known by smooth spot each side behind the middle of thorax. Length 2 mm. (Fig. 148.)

P. sparsus Lec. (1868, 160), described from Lake Superior, is said by Swaine to be misapplied to this, the most abundant bark beetle in limbs of pine. Occurs in Canada, West Virginia and Massachusetts, under white pine bark. In West Virginia mines

in green bark on tops of injured and dying pine; adults in April, May and September. Orange Mts., N. J., rare.* Has a deceptive resemblance to the European *chalcographus*.

1024 (9066). PITYOGENES PULLUS Zimm., 1868, 143.

Dark brown, antennæ and feet ferruginous-yellow; front scarcely hairy. Head of male strongly punctured, rather flat, broad but slightly concave in front; of female, strongly punctured, uniformly convex, with a slight callus in the front. Thorax roughly tuberculate in front, punctured behind, with a faint, smooth dorsal carina. Elytra glabrous, distinctly punctured, but not in rows, since the intervals between the rows are punctured as strongly as the rows themselves; a faint longitudinal groove along the suture, tip rounded; declivity almost without cusps, slightly more retuse in female than in male, but the suture is strongly elevated in both and armed with two or three slight spines. Length 2 mm.

South Carolina. Middle States. (*LeConte.*) Michigan, West Virginia, New York. Atco, N. J., rare on pine. District of Columbia, on pine. Mines under partly green bark of pines on dying trees, branches and tops; April, May, September. (*Hopkins.*) *P. cribripennis* and *P. bisulcatus*, both described by Eichhoff, are synonyms.

1025 (9114). PITYOGENES PUNCTIPENNIS Lec., 1878, 624.

Slender, cylindrical. Piceous, shining, thinly clothed with long, erect yellow hair. Antennal club thicker, obliquely truncate at tip, proximal half smooth and shining, limited by a curved line. Thorax longer than wide, granulato-asperate for more than half the length, sides and behind densely and coarsely punctured, smooth median line rather wide, more or less distinct. Elytra coarsely punctured, though not in altogether regular rows, suture elevated and sutural stria deep for the whole length, declivity of female oblique, retuse, the concave part coarsely punctured; there are two acute discoidal cusps and several small indistinct marginal ones, the most anterior of which is near the suture and more prominent: (Fig. 149, D.) Front tibiæ moderately dilated, two to four dentate. Punctures of prothorax and elytra coarser and more numerous than in *hopkinsi*. Male, head flat, shining, hairy with very long yellow hair; the four larger teeth of apical declivity less prominent. Female, head finely punctured, carinate with an acute elevated line; four larger teeth of apical declivity very prominent. Length 2.3—2.5 mm.

Female described from Marquette, Mich. Male described as *balsameus* by LeConte from Central New York, where it seriously ravaged forests of *Abies balsamea*. Ranges from Maine and Quebec to Michigan and West Virginia. Food plants, *Abies*, *Picea*, *Pinus*. Excavates several radiating, curved, transverse galleries from a small central chamber in the living and dying bark of balsam fir and red and black spruce in western Maine.

*The life history has been written by Dr. M. W. Blackman in Tech. Publ. N. Y. St. Coll. Forestry, 1915, 11—65.

1026 (9067). PITYOGENES PLAGIATUS Lec., 1868, 161.

Less slender than *hopkinsi*. Ferruginous-brown, shining, thinly clothed with long, erect hairs, antennæ and legs paler. Antennæ with smooth basal portion of club smaller, sutures of apical portion nearly straight. Head convex, punctured, with a triangular, opaque, pubescent, frontal spot. Thorax scarcely longer than wide, sides parallel behind, then semicircularly rounded with the apex; base very distinctly rounded towards the sides; surface strongly roughened before the middle, finely but deeply punctured behind, with a smooth oval space just behind the middle. Elytra strongly but not densely punctured, punctures not in rows; declivity scarcely punctured, suture elevated. Tibiæ less dilated than usual, armed with a few not very prominent teeth. Male, declivity of elytra deeply concave, with margin semicircularly elevated from near tip to near suture, armed at its upper limit with a robust horn, slightly hooked at tip, then with two or three denticles, and ending below in a rather prominent tooth. Female, declivity somewhat retuse each side, deeply sulcate and with a very small denticle near the suture and a larger subacute tubercle near tip. Length 2 mm.

Described from Maryland. District of Columbia on pines. (*Ulke.*) Marquette, Mich., not rare. West Virginia, mining under green bark on tops and branches of injured and dying pines; adults, May and October. (*Hopkins.*)

III. IPS* DeGeer, 1775. (Name of an insect.)

Elytral declivity deeply excavated and toothed; prothorax roughened in front. Differs from *Xyloclepte*s by the deeply excavated declivity and second segment of antennal club not surrounding the first; from *Pityogenes* by antennal club being not pubescent on both sides, almost entirely corneous and usually not annulated on inner face; funicle 5-jointed.

SYNOPSIS OF SPECIES OF IPS.

a. Larger, 3.5—6.4 mm.
  b. Sutures of antennal club strongly angulated.
    c. Margin of declivity with three teeth behind the most prominent one. 1027. CALLIGRAPHUS.
    cc. Margin with two teeth behind the most prominent one. 1028. GRANDICOLLIS.
  bb. Sutures of antennal club not angulated, first nearly straight, second bisinuate; marginal declivity with four prominent tubercles. 1029. PINI.†

aa. Smaller, 2.5 mm.
  d. Margin of declivity with two prominent tubercles. 1031. CÆLATUS.
  dd. Margin of declivity with three prominent tubercles. 1032. AVULSUS.

*Equivalent to *Tomicus* Latr. Gen. Crust. & Ins., II, 1807, 276, and *Tomicus* Lec. and Eichhoff, and of most economic literature, or nearly so.

†Several closely allied species are here included; for the differences between them see the descriptions.

1027 (9122). Ips calligraphus Germ., 1824, 461.

Elongate, subcylindrical. Piceous or brownish-testaceous, almost shining, clothed with long yellow or grayish hairs; antennæ yellow. Sutures of the club angulated, the point of the angle directed forwards. Thorax oblong, very finely sparsely punctate behind, a narrow median line smooth, the front part roughly tuberculate, with transverse rugæ. Elytral deeply punctato-striate, punctures large and transverse; intervals subconvex, the internal ones uniseriately punctate, sutural stria subsulcate; apex obliquely excavate truncate, the margin of the excavation with six teeth of which the second and third (counting from above) are the larger (Fig. 149, A), fourth and fifth small, sixth minute apical margin produced; tibiæ strongly toothed. "Declivity deeply concave, polished, sparsely punctured; prolongation of sutural stria well impressed; second interval with a small cusp at end, and a similar one at end of third interval; fourth interval with a large conical tubercle at end which is but slightly connected with the tubercle of fifth interval, the latter always the most prominent. Behind this prominent one are three acute, equidistant teeth, and the acutely elevated apical margin." (*LeConte.*) Length 4.5—6.4 mm.

Canada and Atlantic region to New Mexico. (*Swaine.*) St. Petersburg, Sarasota and Dunedin, Florida; common beneath bark of freshly felled pine; Jan. 21—Nov. 9. West Virginia, mining under green bark on stumps, logs, injured and dying pines of all species; adults found May to November. (*Hopkins.*) *I. exesus* Say is a synonym.

1028 (9123). Ips grandicollis Eich., 1867, 402.

Narrower, cylindrical. Almost shining, with long pale hairs. Thorax oblong, behind less deeply punctate, median line smooth. Elytra less deeply punctate-striate, sutural stria deeper, with dilated punctures, interior intervals slightly convex, base impunctate; apex obliquely excavate truncate, edge of declivity 5-dentate, third tooth the larger, first tooth very minute, apical margin strongly elevated, entire. (Fig. 149, C.) Length 3.2—4.5 mm.

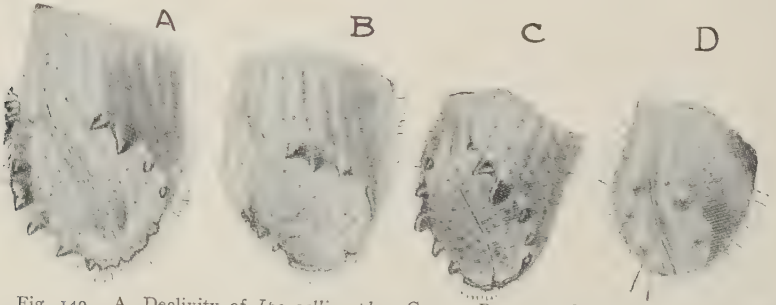

Fig. 149. A. Declivity of *Ips calligraphus* Germ.; B, same of *Ips pini* Say; C, same of *Ips grandicollis* Eich.; D, same of *Pityogenes punctipennis* Lec., male. All much enlarged. (After Felt.)

Lake Co., Ind., rare; May 30. Tybee Island, Ga.; June. (*Wenzel.*) Lake Istokpoga, Sarasota and Dunedin, Fla.; Jan. 30

—March 31. Quebec, Middle Atlantic, Southern and Western States. Food plants, *Pinus*, *Picea*. The *Tomicus cacographus* Lec. and *T. pini* Say of Zimmerman are synonyms.

1029 (9128). Ips pini Say, 1825, 257; ibid, II, 319.

Oblong, cylindrical. Brown or brownish-testaceous, shining, thinly clothed with gray pubescence. Thorax oblong, subovate, slightly punctate behind, apical margin feebly 3-sinuate. Elytra slightly striato-punctate, intervals flat, with interior ones smooth; apex circularly excavate truncate; edge of declivity 4-dentate, second and third teeth coalescent, larger and distant from first. (Fig. 149, B.) Length 3.3—4.4 mm.

Ithaca, N. Y., May 3. Eastern United States and Canada. Food plants, *Pinus*, *Picea* and *Larix*.

In connection with the above, *I. hudsonicus* Lec. (1876) from Hudson Bay territory, *I. interruptus* Mann. (1852) from Alaska and Hudson Bay territory, and *I. perroti* Swaine from Quebec may be mentioned. Though the first has been reported from Utah and Michigan and the second from Quebec, neither is very likely to be found in our territory. LeConte's remarks follow:

"*T. hudsonicus* n. sp. Specimens of a larger size (5 mm.) from Hudson Bay territory have the elytral striæ composed of much larger punctures than in *T. pini*, and the tooth of the fifth interspace has a tendency to become thicker and curved. I would be unwilling to designate it by a separate name, were it not that the sutures of the antennal club are not bent forward at the sides but are nearly straight."

T. interruptus. Alaska and Hudson Bay territory. The teeth of the margin of the declivity are arranged as in *pini* and *hudsonicus;* the striæ are composed of still larger punctures than in the latter, and the punctures of the interspaces extend forward almost to the base."

The record of *I. interruptus* from Quebec may be based upon a specimen of the following recently described species:

1030 (——). Ips perroti Swaine, Can. Ent., XLVII, 356, 1915.

Slender. Dark reddish-brown, clothed with slender hairs, rather densely on sides of pronotum and on sides of elytra below and about the declivity, which is armed with four teeth on each side. Antennal club with the first two sutures slightly bisinuate at middle, strongly bent distad at the sides. Pronotum slightly longer than wide, caudal margin strongly rounded, sides nearly straight and parallel for two-thirds, rather strongly narrowed on distal third, asperate in front, sparsely punctured behind, more coarsely toward sides, median smooth space nearly obsolete. Front rather closely punctured but not extremely dense as in *interruptus; perroti* differs besides from *interruptus* in the usually smaller size, more slender form, finer and sparser pronotal punctuation, much more abrupt declivity with strongly marked sexual variation, and the fewer and smaller granules on first and second interspaces. Length 3.5—4.2 mm.

Type locality, Perrot, Quebec, in *Pinus resinosa* Ait.

1031 (9112). Ips cælatus Eich., 1867, 402.

Elongate, cylindrical. Blackish-piceous, antennæ and legs ferruginous-testaceous. Thorax cylindrical, closely rugosely punctate behind, median line smooth. Elytra deeply punctato-striate, punctures dilated, intervals rugose, apex almost circularly retusely truncate, margin of excavation crenulate, with three denticles about middle. Length 2.5—3 mm.

Tompkins Co., N. Y.; April 26. Pocono Lake, Pa.; Aug. 9. (*Wenzel.*) Canada and United States south to West Virginia. Food plants, *Pinus*, *Picea*, *Abies*. Common under pine bark in Florida. Placed in *Xyleborus* by LeConte.

1032 (9133). Ips avulsus Eich., 1867, 402.

Subelongate, small, cylindrical, glabrous. Thorax oblong, sparsely finely punctate behind. Elytra deeply punctato-striate, intervals moderately convex, smooth; apex circularly retuse, subexcavate, with four tubercles on each elytron, the uppermost minute, second, third and fourth conical, almost equal, apical margin thinly elevated. Length 2.5 mm.

Tybee Island, Ga.; June 24. North Mt., Pa. (*Wenzel.*) District of Columbia. Dunedin, Fla.; April 13. A common species infesting pine in Southern States.

Tribe III. CORTHYLINI.

Pronotum and elytra without scales, commonly glabrous or sparsely pubescent; abdominal sternite 7 with posterior margin rarely rounded; anterior tibia broader toward apex or serrate on outer margin; pronotum with anterior dorsal area commonly rugose; head concealed from above; anterior tarsi with joint 3 simple. (Fig 139, C.)

SYNOPSIS OF GENERA OF CORTHYLINI.

a. First palpal joint cylindrical, glabrous.
b. Apex of elytra emarginate; funicle 2-jointed. (Fig. 137, B.) I. Monarthrum.
bb. Apex of elytra usually rounded.
c. Funicle 1-jointed. II. Corthylus.
cc. Funicle 5-jointed. III. Gnathotrichus.
aa. First palpal joint swollen, hairy; funicle with four to five joints. IV. Xyloterus.

I. Monarthrum* Kirsch, 1866. (Gr., "single" + "joint.")

The species of *Monarthrum* are included by Hubbard (1897) in his account of Ambrosia beetles. The sexes are alike, and males assist females. The young are raised in separate pits, the galleries extending deep into the wood. Eggs are deposited singly,

*Pterocyclon Eich., 1868, though proposed because description referred to *Corthylus* (see B. E. Z. XII, 276) is treated by Hopkins as a synonym.

loosely packed with chips on which ambrosia begins to grow. As the young larvæ eat and grow, they deepen their cradles, swallowing but not digesting the wood. The excrement, yellow-stained, is cast out of the mouth of the borings by the mother, a portion being utilized to form the fungus bed. The ambrosia of *Monarthrum* is moniliform, resembling a mass of pearly beads; the base has a tinge of green, but the stain in the wood is almost black. The two species are commonly associated in the same trunk, attacking hickory, beech, maple, aspen, apple and orange. They enter the green sap and heart wood of logs, stumps and dying and dead trees, causing round black holes called "pin-holes," and discolorations termed "bluing."

1033 (9055). MONARTHRUM FASCIATUM Say, 1825, 255; ibid. II, 318.

Elongate-cylindrical. Piceous, antennæ and legs ferruginous-yellow; elytra yellow in front, black behind, black color commonly extending forward along the suture. Prothorax longer than wide, tuberculate and slightly hairy in front. Elytra very finely punctate-striate, glabrous and shining, at tip obliquely truncate and thickly clothed with yellow hairs; margin of declivity acute and a small tubercle near suture in male. Front femora toothed at tip; outer surface of front tibiæ with teeth-like transverse ridges. Female, antennal club fringed with very long hairs; posterior declivity of elytra slightly concave near suture, with one small tubercle; front with five punctures and a depression. Male antennal club with only a few shorter marginal hairs; declivity of elytra more strongly margined near tip, tubercle replaced by a long elevation, parallel with suture, slightly cuspidate in front; front with coarse punctures. Length 2.5—3 mm. (Fig. 147, A.)

Taken frequently throughout Indiana on freshly cut beech logs and by beating; April 16—Oct. 1. Philadelphia Co., Pa., April 25, on beech. (*Wenzel.*) Ranges from Quebec and Lake Superior to Florida. Occurs on many trees, deciduous and coniferous; *Hicoria*, *Fagus*, *Quercus*, etc.; also bores in wine casks.

P. gracile is separated by Eichhoff (and recognized by Swaine) on account of luteous color of elytra and finer punctuation of head, which is also longitudinally impressed.

1034 (9058). MONARTHRUM MALI Fitch, II, 1855, No. 5.

Brown, base of thorax and elytra paler; antennæ and feet ferruginous-yellow. Very similar to *fasciatus*, but smaller, with the rows of punctures of elytra scarcely visible; the oblique truncation of the tip is glabrous and there are two small teeth near the suture. Length 2 mm. (Fig. 147, B.)

Jackson, Gibson and Posey counties, Ind., scarce; May 4—July 19. Ormond and Dunedin, Fla.; Jan. 15—April 14. Bronx,

Peekskill and Ithaca, N. Y.; Jan. 23 –May 1. Philadelphia Co., Pa., April 25, on beech. (*Wenzel.*) Eastern United States and Ontario, Canada, south to Florida. Food plants, many trees, both deciduous and coniferous. The spine referred to by LeConte & Horn is probably long hairs on club, adhering together. Male and female are reversed by LeConte.

II. CORTHYLUS Erichson, 1836. ("Name of a bird.")

Rather stout cylindrical species in which the funicle of the antennæ is reduced to a single joint; club much larger than in *Monarthrum*, not fringed; upper surface of body strongly punctured; front tibiæ flattened and margined on the outer face, but with no transverse ridges as in *Monarthrum*.

KEY TO EASTERN SPECIES OF CORTHYLUS.

a. Elytra rounded behind without furrows or tubercles. 1035. PUNCTATISSIMUS.

aa. Elytral declivity with small tubercles.

b. Male antennal club without spine. 1036. COLUMBIANUS.

bb. Male antennal club with three sutures, the two outer armed with a long curved spine. 1037. SPINIFER.

1035 (9054). CORTHYLUS PUNCTATISSIMUS Zimm., 1868, 144.

Rather stout, cylindrical. Dark brown or black, antennæ and legs ferruginous. Prothorax longer than wide, extending hood-like over the head, roughly tuberculate in front, shining behind, with fine, sparse punctures. Antennal club articulated or annulated on both sides. Elytra strongly punctured but not in rows, rounded behind without furrows or teeth. Front tibiæ flattened and margined on outer face, without transverse ridges. Female, head flattened, opaque, slightly broadly concave at middle. Male, head slightly convex, shining, punctured. Length 4 mm.

Lawrence and Posey counties, Ind., rare; June 3—July 14. Cape May C. H., N. J., Oct. 22, on roots of huckleberry. (*Wenzel.*) Occurs in the Eastern, Middle, Southern and Western States. Food plants, *Acer*, *Sassafras*, *Cornus*, *Carpinus*, *Corylus*, *Ostrya*, *Gaylussacia*. Felt states that the larva lives on ambrosia, a fungus grown in the galleries of huckleberry roots, where it was described as living by Schwarz.* He says it has a preference for shaded localities where plants grow on a decayed log, or where the soil is thickly covered with leaves, and believes that it is largely subterranean in habit. The infested huckleberries may be detected by wilted leaves, and the infested part of the root by sawdust adhering to it. This species has been recently destructive to cultivated Rhododendrons and Azaleas in New Jersey. (*Weiss*, Journ. N. Y. Ent. Soc., 1916.)

*Proc. Ent. Soc. Wash., II, 109.

1036 (11,241). CORTHYLUS COLUMBIANUS Hopk., W. Va. Agr. Exp. Sta. Bull. No. 36, 1894, 313.

Differs from *punctatissimus* by head of male being faintly and sparsely punctured in front, elytral declivity of male and female provided each side with small tubercles, suture elevated; middle and hind tibiæ with four teeth near tip. In *punctatissimus* the head of male is deeply and coarsely punctured in front; declivity of elytra plain; middle and hind tibiæ with only three teeth near tip. Male antennal club without spine. Length 4 mm.

Recorded from West Virginia, Virginia, Michigan and Massachusetts. The type was from sapwood of living white oak; found also in chestnut oak, tulip, maple, basswood and beech. Hopkins found evidence of injuries in a tulip log, apparently caused by this species, which, according to the number of annual rings formed over the entrance, were produced 13 years before Columbus discovered America.*

1037 (11,240). CORTHYLUS SPINIFER Schwarz, Proc. Ent. Soc. Wash., II, 1891, 114.

The male differs from the male of *punctatissimus* by the retuse elytral declivity (simple in *punctatissimus*) margined at apical third and provided each with three small tubercles; by the antennal club with three sutures (two in *punctatissimus*) of which the two outer are curved and armed with a long curved spine. Length 2 mm.

Male found April 19 in semitropical hammock at Key West, Fla. Female unknown. Food plant, *Quercus.*

III. GNATHOTRICHUS Eich., 1868. (Gr., "mandible" + "hairy.")

The males are distinguished from the females by the stronger development of tubercles or teeth at end of body. The young are raised in cradles as in *Monarthrum*, having been found by Asa Fitch in pine wood in 1857. Hopkins also found them in West Virginia in pine, entering green sap wood at base of stumps and dying trees, causing pin-holes and bluing.

1038 (9060). GNATHOTRICHUS MATERIARUS Fitch, IV, 1858, 40.

Elongate, cylindrical. Shining brown, base of elytra paler; head and under surface black; antennæ and feet yellow. Front somewhat impressed, thickly punctured, hairy. Prothorax long, finely tuberculate in front, smooth behind. Elytra very smooth, with scarcely visible rows of punctures, rounded behind, without tubercles, the posterior declivity not retuse, thinly clothed with short yellow hairs. Male, head with elongated longitudinal elevations in front, ending in an acute point just above base of mandible. Female, antennæ with long hair and bristles as in *retusus;* head smooth and sparsely punctured. Length 3 mm.

*Proc. Ent. Soc. Wash., III, 107.

Iona, N. J., May 7, entering dying pine. (*Wenzel.*) Callander, Ont., July 19. Eastern United States and Canada to Florida and Texas. Infests pine, the galleries being short, parallel and at right angles to main gallery. Schwarz found no males in 150 specimens. The male probably never leaves the burrow.

1039 (9061). GNATHOTRICHUS ASPERULUS Lec., 1868, 155.

Slender, cylindrical. Brownish-black, shining, nearly glabrous; antennæ and feet yellow. Head flat, feebly punctulate. Prothorax one-half longer than wide, feebly narrowed and rounded on the sides from base, strongly rounded at tip, very rough and slightly pubescent before the middle, but almost entirely smooth behind. Elytra scarcely punctulate, posterior declivity with a few hairs, almost uniformly convex, with a very feeble subsutural furrow. Length 1.5 mm.

Described from Virginia. Known also from Washington, D. C., on *Pinus virginiana* Mill.

IV. XYLOTERUS* Erichs., 1836. (Gr., "wood" + "monster.")

Robust, cylindrical species with declivity of elytra oblique, not excavated nor toothed; eyes completely divided; club of antennæ oval, solid, pubescent on both sides, not annulated, the basal shining corneous part extending forward in a narrow band; funicle with first joint large, stout, the remaining joints not very distinctly separated; head in male deeply concave, the prothorax less strongly asperate than in female. As in *Monarthrum*, the males accompany the females; the young are raised in separate cradles, each female attending her own brood, feeding them with a yellowish ambrosia grown in beds near the cradles. The mouth of each cradle is constantly kept filled with a plug of the food fungus. This consists of upright sticks which do not branch and are capable of being broken up into bead-like masses without losing their vegetative powers. Although the color is yellow, the galleries are stained black.

SYNOPSIS OF SPECIES OF XYLOTERUS.

a. Elytra with ill defined distant rows of punctures; intervals equally strongly punctured; pubescence erect, abundant. 1040. POLITUS.

aa. Elytra with well defined striæ of punctures, intervals nearly smooth.

b. Prothorax finely and sparsely punctured at sides towards base.

c. Larger, 4.5 mm.; less punctured at base of thorax. 1041. RETUSUS.

cc. Smaller, 3.5 mm.; more punctured at base of thorax. 1042. LINEATUS.

*This name is preferred by Hopkins to *Trypodendron* Steph., Ill. Brit. Ent., III, 1830, 353, used by Swaine for the following species: *politus* Say, *retusus* Lec., *scabricollis* Lec., *lineatus* Oliv.

bb. Prothorax scabrous and granulate behind middle.

1043. SCABRICOLLIS.

1040 (9095). XYLOTERUS POLITUS Say, 1828, 256; ibid, II, 318.

More hairy than the other species, with elytral intervals sparsely punctured, so that the rows of punctures appear confused. Smaller, smoother, unicolorous. Male, hind tibiæ narrower; anterior edge crooked and near tip thickly clothed with long silky hairs with incurving points; tarsus with fine hairs curved at points. Female, hind tibiæ broader; anterior edge straight, with a few straight bristles; tarsus with short straight hairs. Length 3.3 mm. (Fig. 150.)

Fig. 150. × 12. (After Hagedorn.)

Ithaca, N. Y., April 26. Angora, Pa., Mar. 20, on oak, entering sap-wood near ground. (*Wenzel.*) Eastern United States and Canada. Food plants, *Quercus, Fagus, Acer, Betula, Hicoria, Fraxinus, Castanea, Magnolia, Alnus, Picea, Pinus.* Infesting the sap-wood of deciduous and coniferous trees; a dangerous enemy to smooth-bark trees weakened by external injury or storm. They enter the green wood of logs, stumps, dying trees and wounded places on green trees, and although they sometimes fail to establish their colonies, as shown in maples at Washington, D. C., they are very injurious to outer portions of wood. Adults have been observed in West Virginia from March to August.

1041 (9092). XYLOTERUS RETUSUS Lec., 1868, 158.

Cylindrical, rather stout. Blackish-brown, shining. Head of male deeply concave, sparsely finely punctured, clothed with erect hairs. Prothorax much broader than long, rather quadrate in form, as broadly rounded at tip as at base, convex, very strongly declivous and broadly impressed near tip; asperate with transverse granulations and clothed with long erect hair in front, finely, not densely punctured behind. Elytra with distant rows of rather fine, not deeply impressed punctures, each with a testaceous vitta, abbreviated before and behind. Female, head convex in front, roughened with minute granules, and with a small depression in centre; antennæ with a long bristle rising from the anterior edge of each joint of funicle and first and second joints of club; also with a few long hairs, all curving upward. Club of male antennæ with a few short, stiff hairs, no long bristles; head with longitudinal elevation in front. Length 4.5 mm.

Canada, West Virginia. Food plant, the large toothed aspen, *Populus grandidentata* Michx., entering the green sap-wood of dying trees, causing large pin-holes. Adults, (West Virginia) August 10.

1042 (9093). XYLOTERUS LINEATUS Oliv., 1795, 18.

Male with head concave and thorax finely, transversely asperate before the middle; female, head convex, thorax much more roughly asperate. Varies greatly in color, the black elytral vittæ sometimes occupying nearly the entire surface, sometimes almost wanting; front part of prothorax, suture and margin of elytra usually black; sometimes only a short pale stripe is seen on each elytron. Length 3.5 mm.

North Mt., Pa., June 11, entering hemlock. (*Wenzel.*) Canada, Eastern, Northern and Western United States, New Mexico. Common in coniferous trees from Alaska to Maine, extending southward in mountainous regions, and equally common in Europe. Food plants, *Pinus*, *Picea*, *Abies*, *Tsuga*, *Juniperus*, *Larix*, *Betula*, black spruce and hemlock. Enters green sapwood of logs, stumps and dying trees, causing great damage to saw logs, producing pin-holes and bluing, and hastening decay. *X. bivittatus* Kirby is a synonym.

1043 (9094). XYLOTERUS SCABRICOLLIS Lec., 1868, 158.

Uniform reddish-brown, antennæ and feet paler. Head deeply concave, as usual, but thorax of male as rough in front as in female of *bivittatus*, and covered behind with anastomosing curved lines, leaving between them flattened granules. Elytra shining and punctures of rows larger and more strongly impressed. Length, 3.5 mm.

Grenlock, N. J., April 8, entering white pine. (*Wenzel.*) Quebec, Washington, D. C., West Virginia, New York, New Mexico. Food plants, *Pinus*, *Hamamelis* and *Tsuga*. Enters green sap-wood of dying pine trees; adults in May. (*Hopkins.*)

Tribe IV. MICRACINI.

Pronotum with anterior area commonly rugose; head concealed from above; anterior tarsi with joint 3 simple; anterior tibiæ not distinctly broader toward apex or not serrate on outer margin; antennal club compressed; elytra with scales. (Fig. 139, D.)

KEY TO GENERA OF MICRACINI.

a.	Thorax margined at side.	I. MICRACIS.
aa.	Thorax not margined at side.	II. THYSANOES.

I. MICRACIS Lec., 1868. (Gr., "small"+Cis.)

Elongate cylindrical species, in which the declivity of elytra is convex and suture prolonged into a short acute point; thorax granulate, the granules becoming larger and acute in front of middle. Club of antennæ peculiar, having an elongated basal smooth spot extending for more than half its length, parallel to

which the sutures form loops; scape broadly dilated and fringed toward extremity with very long hairs. (Fig. 136, A.) The funicle of antennæ is 6-jointed, and by this character and the broad parallel front tibiæ, as well as the more obvious characters stated, the genus is sharply defined. The species are small, 2.5 mm., and occur from Massachusetts southward, in twigs and small branches of various hardwood trees.

KEY TO EASTERN SPECIES OF MICRACIS.

a. Sutures of antennal club forming narrow curves.
b. Eyes distant beneath; length 2.5—2.7 mm. 1044. SUTURALIS.
bb. Eyes contiguous beneath; elytra more finely punctured; size smaller, 1.7 mm. 1045. NANULA.
aa. Sutures of antennal club forming broad curves.
c. Eyes widely distant beneath; elytra nearly glabrous, with rows of coarse punctures, asperate near tip. 1046. RUDIS.
cc. Eyes narrowly separated beneath.
d. Elytra shining, punctured in rows; thorax finely asperate in front. 1047. OPACICOLLIS.
dd. Elytra obsoletely striate, densely rugosely punctured; thorax more strongly asperate in front. 1048. ASPERULUS.

1044 (9136). MICRACIS SUTURALIS Lec., 1868, 165.

Small, elongate, cylindrical. Dark brown, antennæ yellow, elytra and front part of thorax more or less paler, not shining. Antennal scape broadly triangular, flattened, fringed toward tip with very long yellow hairs; first joint of funicle as long as others united, 2—5 closely connected, gradually becoming shorter and broader, club as described under generic heading. Head flat or concave, more or less thinly fringed with long hair. Thorax one-half longer than wide, sides parallel behind middle, rounded in front, base feebly rounded, surface dull with fine reticulations, and scattered granules. Elytra with close rows of fine punctures, almost connected by feeble transverse rugosities, pubescence fine and short, more or less arranged in lines; declivity convex, not at all excavated or toothed, sutural angle prolonged into a short acute point. Tibiæ compressed, armed with a terminal hook, outer edge acute, not toothed, fringed with long hair, the front pair as broad at base as at tip. Length 2.5—2.7 mm.

Described from Illinois from specimens cut from prickly ash (*Xanthoxylum*). Known from Virginia, Massachusetts and New York to Michigan, Kansas and Louisiana. Southwestern Pennsylvania, breeding in hickory and locust. (*Hamilton.*) Food plants, hickory, elm, redbud, oak, walnut, spice-wood, willow, sassafras, locust, hazelnut, etc. Breeds abundantly in dead hickory limbs, requiring two years for its transformation.* This statement has been questioned and reaffirmed by Dr. Hamilton

*Hamilton, Ins. Life, IV, 131; loc. cit., 268.

with further detail, but still regarded with doubt by Chittenden, who states that this species passes its entire existence from egg to imago in the wood, never under the bark, the imago probably maturing in August, but gnawing its way out to the light only in April following. It is extremely abundant in redbud, especially in smaller limbs that have become dry and sapless and are easily crumbled between one's fingers.

M. aculeatus Lec. is a synonym of *suturalis*. It was based on a specimen in which the pubescence of elytra was well preserved, "clothed with short, suberect yellowish hairs which are slightly clavate." (*LeConte.*) Chittenden states the synonymy on the authority of Schwarz.

1045 (9138). Micracis nanula Lec., 1876, 368.

Differs by the eyes being contiguous beneath, the gular space between the eyes of *suturalis* being absent and the eyes themselves more coarsely granulated. Smaller and narrower than the other species, brown, elytra somewhat shining, with numerous rows of short, pale bristles, sutural prolongation less prominent. Length 1.7 mm.

Dunedin and Haulover, Fla.; March 4. Occurs on *Myrica*.

1046 (9141). Micracis rudis Lec., 1876, 368.

Cylindrical. Nearly black, rather shining, antennæ reddish-brown. First joint of club with tuft of hairs near tip. Head very deeply excavated; eyes widely distant above. Thorax somewhat longer than wide, broadly rounded in front, sides parallel behind, surface sparsely granulate behind, rough with numerous tubercles in front. Elytra scarcely pubescent, rugosely punctured, punctures large, arranged in approximate rows; intervals rough with small acute tubercles on the declivity which is convex except near the concave tip, sutural point well developed. Tibiæ feebly toothed on outer edge, fringed with long hair, front pair as broad at base as tip. Length 2.5 mm.

Vermillion and Marion counties, Ind., rare; Jan. 1—June 15. Described from Detroit, Mich.; District of Columbia in willow; southwestern Pennsylvania. Food plants, hackberry, locust and hickory.

1047 (9140). Micracis opacicollis Lec., 1878, 625.

Slender, cylindrical. Dirty testaceous, thorax darker, thinly sprinkled with very small ochreous scales. Club of antennæ with broadly curved sutures, scape (male) fringed with very long hair. Eyes extending to under surface of head, not widely but distinctly separated beneath. Thorax opaque, indistinctly punctulate. Elytra shining, punctured in rows; intervals with rows of very short stout bristles. Length 1.7 mm.

Westville, N. J., Feb. 5, in oak twigs. (*Wenzel.*) Described from Detroit, Mich. Common in New Jersey in small oak twigs, winter and spring. Occurs also in New York and District of Columbia, boring in old twigs. (*Ulke.*)

1048 (9139). MICRACIS ASPERULUS Lec., 1878, 626.

Slender, cylindrical. Black, entirely opaque, thorax sprinkled with small yellowish, scale-like hairs, antennæ and legs ferruginous. Club of antennæ with broadly curved suture; scape of male fringed with very long hair. Eyes very narrowly separated beneath; head not concave, scarcely punctured. Thorax more strongly asperate in front than in *opacicollis*, scarcely punctured behind. Elytral intervals with rows of very short stout bristles. Length 1.7 mm.

Described from Detroit, Michigan, in dead oak twigs; also recorded from New York, Pennsylvania and Virginia. Doubtfully distinct from *opacicollis*.

II. THYSANOES LeConte, 1876. (Gr., "fringed.")

Small, slender, cylindrical species having the thorax sparsely asperate in front; elytral intervals provided with rows of pale bristles, the declivity simply convex; front tibiæ of the same parallel form and as wide at base as at tip, as in *Micracis*, not serrate on outer edge; scape of antennæ fringed as there but the joints of funicle widely separated, becoming rapidly wider and fringed with long hair;* club elliptical, compressed, rather shining, sparsely hairy and without sutures on its inner face. The species live in twigs of hickory, oak, etc.

1049 (9143). THYSANOES FIMBRICORNIS Lec., 1876, 370.

Slender, cylindrical. Yellowish-brown; head of male shining, flattened, with a small fovea on vertex; antennæ as described above. Thorax longer than wide, sparsely asperate in front and slightly hairy, then not densely punctured for a short distance, nearly smooth behind middle, and at sides. Elytra with rows of small punctures; those of intervals smaller and more distant, supporting short, clavate, pale bristles in regular rows; declivity convex, not at all impressed or retuse, sutural line very slight. First and second ventral segments each as long as others united, third, fourth and fifth short, equal; last dorsal slightly visible from beneath. Front tibiæ broad from base, sides parallel, outer edge acute, not serrate. Length 1.8 mm.

Westville and Chews Landing, New Jersey; June 9—June 16; on hickory twigs and just leaving the wood. (*Wenzel.*) April and May. (*Packard.*) Described from Lancaster County, Pa.; known also from District of Columbia. Food plant, hickory.

*Compare the antennæ of *Loganius ficus*, which have similar characters.

1050 (9097). THYSANOES RIGIDUS Lec., 1876, 362.

Dark brown, somewhat shining. Form stout, cylindrical, somewhat oval, clothed with rather long, erect, pale bristles. Prothorax a little wider than long, convex, anterior edge not toothed, disc with a few distant acute tubercles in front of middle, sparsely punctured behind. Elytra punctured in rows, setigerous punctures of interspaces very small. Legs and antennæ yellow-brown; club oval, hairy, sutures curved, surface rather shining. Male,* front with a small rounded, polished excavation. Length 1 mm.

Known from Canada and Michigan. Dr. Hopkins states in a letter that this species belongs to the Micracini.

Thysanoes quercus Hopk., Mss., is an undescribed species, cited in Smith's List of New Jersey Insects, infesting the bark of dead oak and chestnut twigs. Eagle Rock, near Newark, New Jersey. (*Bischoff.*)

Tribe V. CRYPTURGINI.

Body slender to moderately stout; pronotum longer than broad, (or at least not broader than long), commonly smooth in front; antennal club subglobose, compressed, never conical (Fig. 137, H); head exposed or rarely concealed from above; eyes simple; base of elytra simple.

KEY TO GENERA OF CRYPTURGINI.

a. Third joint of tarsi simple, fourth joint distinct. I. CRYPTURGUS.
aa. Third joint of tarsi expanded, usually heart-shaped or bilobed. II. DENDROCTONUS.

I. CRYPTURGUS Erichs., 1836. (Gr., "hidden" + "laborer.")

Very small, cylindrical, elongate species (1—1.5 mm.) in which the thorax is simply punctate and elytra unarmed on declivity; set aside by all authors on account of the 2-jointed funicle. One species *atomus* LeConte (1868) is generally regarded as identical with Gyllenhal's *pusillus* (though retained as distinct by Swaine), found in Europe and Japan. Another has been made known by Schwarz, under the name *alutaceus*. Both differ in habitually making use of the galleries of other bark beetles in entering the trees. (Fig. 139, E.)

*Schwarz (Ent. Amer., II, 42) says he believes this description applies to the female; what he takes for male has the head deeply retracted in thorax, so the sculpture cannot be seen; but the first antennal joint is fringed with a double row of long pale hair, as in certain species of *Micracis*.

1051 (9186). Crypturgus pusillus Gyll., 1813, 371.

Fig. 151. × 26. (After Hagedorn.)

Small, elongate, cylindrical. Shining, dark piceous, antennæ and legs brown, slightly hairy on head and at sides of thorax, and with short, fine, yellowish pubescence on elytra. Beak very short. Second joint of funicle much smaller than first, club tolerably large, solid, strongly compressed, oval, obliquely narrowed on outer half, corneous, shining and but slightly pubescent on oblique edges. Head large, exserted, visible from above. Thorax longer than wide, scarcely narrowed in front, slightly rounded on sides, more rounded at base and tip, uniformly sparsely but strongly punctured. Elytra elongate, cylindrical, with rows of large punctures, the sutural one impressed toward base; intervals with scarcely perceptible rows of small punctures, declivity convex, without impressions. Ventral sutures straight, first and fifth segments longer. Front coxæ contiguous; tibiæ dilated, finely serrate, tarsi slender, third joint not dilated. Length 1—1.5 mm. (Fig. 151.)

Pocono Lake, Pa., Aug. 14, under dead and dying pine. (*Wenzel.*) Occurs in Canada, Maine, Massachusetts, New York, West Virginia, New Jersey, under bark of dead pine branches, and in spruce, fir and hemlock, making a short, sinuous primary gallery about half an inch long, which gives off at intervals about ten short secondary galleries from each side. They are not made in the sap-wood, but penetrate only the bark, so that no regular pattern is made. This species, fide Hopkins, enters the galleries of other bark beetles, from which it starts its numerous small, irregular galleries through the bark. The same habit is recorded by European authors. In West Virginia adults were observed from March to October. Packard says it occurred in abundance in Maine in the bark of white pine stumps (the trees having been felled the previous November) in all stages from the middle of July to Sept. 1.

1052 (11,254). Crypturgus alutaceus Schwarz, 1893, 17.

Elongate, nearly cylindrical. Moderately shining, sparsely and inconspicuously pubescent, pubescence longer on head, sides of thorax and on elytral declivity; color brown or yellowish-brown, antennæ and legs pale. Head distinctly alutaceous, extremely, finely and obsoletely punctulate. Thorax slightly longer than wide, slightly rounded on sides, widest at middle, surface distinctly alutaceous and with sparse, fine, more or less obsolete punctures; and a faint smoother median line is feebly indicated. Elytra as wide and nearly twice as long as thorax, more shining, punctate-striate; striæ distinctly impressed with the punctures closely placed and moderately strong; intervals narrower than the striæ, convex and without distinct punctures, declivity simple. Length 0.9 mm.

Lahaway, N. J., March 26, on dead and dying pine. (*Wenzel.*) Described from Tampa, Fla., and Bladensburg, Md. Occurs under bark of *Pinus palustris* in Florida and under that of *Pinus virginiana* near Washington, D. C. The galleries always start from the main gallery of a *Tomicus*, usually *cacographus*, rectangularly or obliquely; at irregular intervals secondary galleries branch off. Nearly the same size and form as *pusillus*, but the latter is at once distinguished by the more shining head and thorax, the very conspicuous large punctures on thorax and the wide elytral intervals.

II. DENDROCTONUS Erichson, 1836. (Gr., "tree"+"destroyer.")

Club of antennæ short, obtuse, sometimes thick and almost globose, sometimes compressed, always composed of closely united knob-shaped joints (Fig. 137, H); basal margin of elytra acutely elevated and serrate; third joint of tarsi bilobed, not received in second; beak very short and thick; abdomen cylindrical; tibiæ serrate on outer margin; antennæ geniculate; head large and prominent, with the median segment of the epistoma produced into a process or protuberance; anterior coxæ almost contiguous; abdominal sutures 4, 5 and 6 strongly recurved. The species of this genus have been elaborately monographed by Hopkins (1909-a), from whose work the following is abridged. Our treatment of the genus is brief, as the reader may easily procure the work referred to, with its wealth of illustration and results of minute study. (Figs. 132, 134, 135.)

SYNOPSIS OF SPECIES OF DENDROCTONUS.

a. Pronotum somewhat elongate and as broad as elytra, not distinctly narrowed anteriorly; anterior dorsal half of elytra without long hairs; length 2.5—4 mm. 1053. FRONTALIS.

aa. Pronotum stout, usually narrower than elytra and distinctly narrowed and constricted anteriorly; anterior dorsal half of elytra normally with long hairs, except in *terebrans*.

b. Front usually with posterior impression; pronotum with large and small punctures intermixed.

c. Length 3.5—5 mm.; reddish to brown; elytral declivity with striæ deeply impressed; epistomal process narrow, flat, with lateral sections nearly parallel; pronotum with punctures moderately regular. 1054. SIMPLEX.

cc. Length 4.7—6 mm.; reddish to black; elytral declivity with striæ not deeply impressed; epistomal process broad, concave, lateral sections oblique; punctures of pronotum distinctly irregular. 1055. PICEAPERDA.

ccc. Length 6.5 mm.; brownish; elytral striæ impressed; punctures coarse, interspaces narrow and moderately coarse, acute, rugosities coarser toward suture. 1056. PUNCTATUS.

bb. Front without posterior impression; pronotum with regular punctures.

d. Length 5—8 mm.; black; epistomal process moderately broad, with apical angles usually tuberculate; pronotal punctures very coarse, regular, moderately dense, scarcely decreasing in size toward base; elytra with long hairs toward base. 1057. TEREBRANS.

dd. Length 5.7—9 mm.; reddish, never black; epistomal process broad, with apical angles obtuse, never tuberculate; pronotum with punctures smaller and denser toward base; elytra with long hairs toward base. 1058. VALENS.

1053 (9185). DENDROCTONUS FRONTALIS Zimm., 1868, 149.

Light brown to nearly black; reddish-brown in the type. Elytral declivity with long hairs, striæ distinctly punctured, intervals with moderately coarse rugosities, not very densely placed. Pronotum with a few long hairs in front at sides. Front with a moderately prominent tubercle each side of a distinct median groove. Male, pronotum without transverse elevation. Female, pronotum with transverse ridge across the anterior area. Length 2.5—4 mm.

Occurs from Pennsylvania and West Virginia to Florida, Oklahoma and Texas. Host trees, numerous species of *Pinus* and *Picea*.

1054 (9183). DENDROCTONUS SIMPLEX Lec., 1868, 173.

Reddish to reddish-brown, with head and thoracic segments from light to dark brown and nearly black. The size, and the coarser and deeper punctures of pronotum are distinctive characters. Elytral declivity with striæ deeply impressed, rugosities moderately coarse, finer on lateral areas. Pronotum with distinctly coarse and fine punctures intermixed, moderately long reclining hairs on lateral area. Epistomal process narrow, flat, sides nearly parallel, apex not extending beyond the anterior frontal margin. Male elytral declivity shining, intervals convex and smooth. Female elytral declivity with intervals more rugose and striæ more distinctly impressed. Length 3.5—5 mm.

Occurs in Maine, Michigan, West Virginia, Ungava Bay, Canada, and New Hampshire. Host tree, *Larix laricina*.

1055 (——). DENDROCTONUS PICEAPERDA Hopk., 1901-b, 16.

Elytra red or dark reddish-brown; thorax, head and abdomen black. Head with front convex and with faint median and posterior impression and anterior elevated line. Elytral intervals slightly convex, rugosities acute, rather closely placed, irregular. Punctures of pronotum distinctly irregular, epistomal process broad, concave, with the lateral section oblique. Male, striæ of elytral declivity not impressed, intervals finely punctured with very small granules toward apex. Female, striæ of declivity very faintly impressed, intervals with approximate rows of fine granules. Length 4.7—6 mm.

North Mt., Pa., Aug. 31, under spruce bark. (*Wenzel.*) Occurs in Maine, Michigan, New Hampshire, Canada, Pennsylvania. Host trees, *Picea rubens, canadensis, mariana.*

1056 (9182). DENDROCTONUS PUNCTATUS Lec., 1868, 173.

Dark reddish-brown. Head convex, with moderately distinct anterior impression. Punctures of pronotum distinct, coarse, irregular; posterior half of proepisternal area punctured. Striæ of elytral declivity impressed and with coarse punctures; elytral striæ distinctly impressed; punctures coarse and distinct; interspaces rather narrow, convex, moderately rugose on dorsal area, but nearly smooth on lateral area. The coarse punctures of elytral striæ, especially on the declivity, at once distinguish this species. Length 6.5 mm.

Adirondack Mts., New York; Pennsylvania. High Mts. of Randolph Co., W. Va., under bark on spruce stump.

1057 (9179). DENDROCTONUS TEREBRANS Oliv., 1795, 6.

Piceous to deep black, the latter prevailing. Front convex, without impressions, epistomal process moderately broad, lateral angles tuberculate. Pronotal punctures very coarse, regular, moderately dense, scarcely decreasing in size toward base. Elytra without long hairs toward base. Length 5—8 mm.

Dunedin, Fla., Feb. 12—Nov. 9. Lahaway, N. J., Mch. 23, in dying pine. (*Wenzel.*) Ranges from New Hampshire and Pennsylvania south to Texas and Florida. Host trees, *Pinus palustris, rigida, taeda, scrotina, strobus, echinata, rubens.* Specimens are sometimes found which appear to be hybrids with *valens.*

1058 (——). DENDROCTONUS VALENS Lec., 1860, pt. 2, 59.

Above light to dark red, never black, ventral part of body light red to black. Distinguished from *terebrans* by less uniform and more densely placed pronotal punctures, much broader epistomal process, with the lateral sections less angular and more oblique, and the more evident and numerous hairs on the anterior dorsal area of the elytra. Male, mandibles stouter, antennal club narrower, declivity more opaque, striæ less distinctly impressed, punctures more obscure. Length 5.7—9 mm. (Fig. 132.)

West Point and Ithaca, N. Y., May 3—June 2. Occurs from Canada and New England south to North Carolina; also in the Western Mts., LeConte's type being from California. Host trees, *Pinus* many species, *Picea, Larix* and *Abies.*

In addition to the species above treated, it is necessary to consider *D. borealis* Hopkins (1909-a) and *D. rufipennis* Kirby (1837). The first is found in Alaska, Kenai Peninsula; was known to Dr. Hopkins by but five specimens in 1909, and is brought within the scope of our work by its mention in a list of Labrador Coleoptera by John D. Sherman, Jr., based

upon a determination by Hopkins, the only instance of its occurrence except on the North Pacific Coast. The second was described by Kirby from Lat. 65°, has been erroneously identified since by several authors, and was known by Hopkins only from a small number of Lake Superior and Hudson Bay specimens. Both are therefore so unlikely to occur in most of our territory that it seems better to add descriptions but omit from the key.

1059 (——). DENDROCTONUS BOREALIS Hopk., 1909-a, 133.

"Nearly black, elytra more or less reddish. Head with front convex, with faint anterior and posterior impressions and faint anterior line. Punctures of pronotum distinctly irregular, posterior half of pro-episternal area not punctured; punctures of pronotum and elytra moderately coarse. Elytral striæ scarcely impressed except in dorsal area, those of declivity not deeply impressed. Interspaces scarcely coarser and but faintly rugose, except toward base and vertex." Length 6 mm. "The short, stouter form, short and broad pronotum, with the punctures more uniform in size, punctures of dorsal striæ of elytra finer and less distinct, distinguish this from allied species." (*Hopkins.*) Length 6 mm.

Alaska and Labrador.

1060 (——). DENDROCTONUS RUFIPENNIS Kirby, 1837, No. 261, 195.

Elytra red, thorax, head and abdomen reddish-brown. Head convex, with faint anterior and posterior impression and short anterior line. punctures of the posterior part of pro-episternal area, the more distinctly red terior half of pro-episternal area punctured. Striæ of elytral declivity not deeply impressed and with fine punctures; elytral striæ scarcely impressed except toward suture; strial punctures moderately coarse; interspaces with rugosities moderately coarse, sparse and acute. The coarse punctures of the posterior part of pro-episternal area, the more distinctly red elytra, the bright red hairs and the much less distinctly impressed elytral striæ of the lateral area, are distinctive characters. Length 6.2—6.7 mm.

Lat. 65°, Hudson Bay territory; White Fish Point, Lake Superior; Grand Island, Mich.

Tribe VI. PHLŒOTRIBINI.

Body stout; head exposed or rarely concealed from above; antennal club subglobose, compressed to laminate, never conical (Fig. 136, D); pronotum always broader than long, with anterior dorsal area commonly smooth; tarsi with third joint simple or bilobed.

KEY TO GENERA OF PHLŒOTRIBINI.

a. Club of antennæ lamellate. (Fig. 137, I.) I. PHLŒOPHTHORUS.
aa. Club of antennæ globose.
b. Anterior coxæ separated.
c. Antennal club with suture. II. PHLŒOSINUS.
cc. Antennal club solid. (Fig. 137, F.) III. CHRAMESUS.
bb. Anterior coxæ contiguous.
d. Eyes kidney-shaped. IV. CARPHOBORUS.
dd. Eyes divided. V. POLYGRAPHUS.

I. PHLŒOPHTHORUS Wollaston, 1854. (Gr., "bark"+"destroyer.")

The species formerly included in *Phlœotribus* are now found to belong to *Phlœophthorus*, which is separated from the older genus as follows:

a. Antennæ approximate on the front, with very long funicular joints, club consisting of three long lamellæ, thickly pubescent. PHLŒOTRIBUS.

aa. Antennæ distant on the front, with elongate, 3-jointed club, the separate joints of which are not greatly produced laterally. PHLŒOPHTHORUS.

Either genus is immediately distinguished from the other genera by the lamellate club of antennæ, composed of three separate joints; head but little prolonged in front of eyes, antennal groove absent; tibiæ dilated, compressed, serrate at tip, inner angle slightly mucronate; tarsal joints 1—3 short, gradually a little wider, third not emarginate, fourth very small; basal margin of elytra arcuate, acutely elevated and serrate, striæ with large punctures; thorax uniformly punctured.

KEY TO EASTERN SPECIES OF PHLŒOPHTHORUS.

a. Club with lateral extensions of segments more than twice as long as their width at base.

b. Thorax rugose towards sides and base, rugosely punctured on dorsal area. 1061. SCABRICOLLIS.

bb. Thorax finely punctate throughout. 1062. LIMINARIS.

aa. Club with lateral extensions of segments not more than twice as long as wide.

c. Club with lateral extensions of segments about twice as long as wide. 1063. FRONTALIS.

cc. Club with lateral extensions about as long as wide. 1064. PICEÆ.

1061 (——). PHLŒOPHTHORUS SCABRICOLLIS sp. nov.

Length, male type, 2.3 mm., width, 1.35 mm. Pronotum black, slightly narrower than elytra with irregular rugosities, extending towards sides and base, dorsal area opaque and closely rugosely punctured. Elytra reddish-brown, striæ narrow, impressed, and closely punctured, interspaces broad, flat, rugose with two or three irregular rows of fine scale-like hairs, lateral margin of declivity sparsely serrate. Front narrow, concave, eyes not emarginate; antennal club with three moderately long sublaminate joints, scape much longer than the 5-jointed funicle and sparsely fringed with moderately long hairs. Type, Cat. No. 7485, U. S. National Museum. (Described by *A. D. H.*)

Hessville, Ind., July 14; W. S. Blatchley, collector. This species is very different from any of the North American or European species of *Phlœophthorus* but comes closer to *Phlœotribus* (*Phlœophthorus*) *scabratus* Blandf. The very long laminæ of the

antennal club suggests a closer affinity with the true *Phlœotribus* than in any other species of the genus *Phlœophthorus* which includes our typical species *P. frontalis* Oliv. and *P. liminaris* Harris. No true *Phlœotribus* has yet been recognized from the U. S. (*Hopkins.*)

1062 (9159). PHLŒOPHTHORUS LIMINARIS Harris, Rep. Ins. Inj. Veg., 1852, 78.

Closely allied to the next but differing by the finer punctuation of thorax, elytral intervals flat, without acute granules though still feebly serrate at sides and apex, and by the much longer, lamellate joints of antennæ. Length 2.2 mm.

Occurs from Atlantic States and Canada to Tennessee, depredating on peach. New Jersey, May, on peach, plum, cherry. Food plants, *Prunus persica, armeniaca, cerasus, serotina; Pyrus malus.* (*Swaine.*) Originally falsely accused of causing the disease known as "yellows" on peaches, this species is now known to attack only moribund peach and allied trees. It runs transverse galleries in the inner bark, two diverging from a common entrance chamber, in which many eggs are laid at close intervals. These hatching, the young grubs make their expanding sinuous channels at right angles to the parent galleries. The remedy is to cut and burn the infested trees. In West Virginia Hopkins found adults in February, April, May, July and November. They hibernate in the outer bark of living trees. In Europe a similar species is found on olive.

1063 (9160). PHLŒOPHTHORUS FRONTALIS Oliv., 1795, 78.

Small, cylindrical, short, Brown, antennæ and legs ferruginous, clothed with short stiff hairs. Head in male broadly concave, armed with a small, erect, acute spine each side above the insertion of the antennæ, the spines varying in length according to the individual; head in female nearly flat with a faint crescentic impression. Antennæ with 3-jointed lamellate club, joints not more than twice as wide as long, funicle short, 5-jointed. Thorax finely not densely granulate-punctate. Elytra with basal margins separately arcuate, acute and serrate, and with deep striæ of large punctures; intervals narrow with single rows of small acute granules, sides and apex strongly serrate. Tibiæ dilated, compressed, obliquely rounded and serrate at tip, with the inner angle slightly mucronate. Length 1.5—2 mm. (Fig.152.)

Fig. 152. × 20. (After Forbes)

Marion, Lawrence and Posey counties, Ind., frequent; April 14—July 29. Swarthmore, Pa., Jan. 15. (*Wenzel.*) Occurs from Atlantic States to Florida, westward to Iowa. Found in bark of old stumps in swamps in South Carolina. (*Zimmerman.*) Mining under green bark on living injured and dying mulberry and in broken branches, April 9—Dec. 4, the adults hibernating in outer bark on living trees. (*Hopkins.*) Besides mulberry, Swaine gives hackberry and paper mulberry as food plants. Schwarz (1893, 146) states that in the last named the irritation caused by the working of the female starts an abnormal growth, consisting of ridges, blisters and tubercles, which produce a resemblance to an incipient black-knot.

1064 (——). PHLŒOPHTHORUS PICEÆ Swaine, Can. Ent., XLIII, 1911, 220.

More slender than *liminaris* or *frontalis*. Brown to black, sparsely hairy. Antennæ with club of three segments, each with lateral dilations less elongate than in *frontalis;* head subglobose. Thorax with lateral margins slightly, front margin broadly rounded, sparsely clothed with rather stout yellowish hairs arising from the sparsely placed, slightly tuberculate, very coarse punctures. Elytra rather elongate, sides subparallel, strongly narrowed behind, base raised and margined with stout recurved crescentic tubercles, deeply punctate-striate, striæ with large, deep, closely placed punctures; intervals strongly raised, carinate, with a row of setose tubercles; larger behind, forming serrations on declivity. Tibiæ with one submarginal and six distal spines and tubercles, clothed with long hairs. Length 2—2.5 mm.

Province of Quebec, Canada. In dead but green branches of *Picea canadensis* Mill.

II. PHLŒOSINUS Chapuis, 1869. (Gr., "bark"+"curse.")

Small species, somewhat resembling *Phlœophthorus frontalis,* but usually larger (2—3.5 mm.); eyes deeply emarginate in front; pubescence fine, more or less sparse, thorax simply punctured; declivity of elytra more or less tuberculate with first and third intervals elevated, more strongly in male; front coxæ separated. (Fig. 136, D.) The species depredate on cedars and allied trees in Europe and this country, a western species attacking even the giant sequoias of California.

1065 (9171). PHLŒOSINUS DENTATUS Say, 1825, 258; ibid. II, 319.

Subcylindrical. Head, thorax and under surface piceous; elytra dark reddish-brown, antennæ and legs paler. Antennæ with 5-jointed funicle, first joint rounded, remaining four joints closely united and gradually broader, club large, oval, obtusely pointed. Head granulate-punctate, front not carinate. Thorax wider than long, apex strongly oblique, the prosternum being only one-half as wide as pronotum, disc

finely, deeply, not densely punctate. Elytra with declivity finely tuberculate or serrate, more abrupt and flattened, striæ impressed and scarcely punctured; intervals wide, densely and strongly granulate and rugose, the rugosities becoming acute tubercles on declivity of alternate intervals; second interval not depressed on declivity and with a row of smaller tubercles in some specimens. Tibiæ acutely serrate, tarsi with joints 1—3 equal, the third bilobed, fifth nearly equal to others united. Male with first and third intervals elevated, the declivity with rows of rather prominent tubercles. Female declivity with rows of granules in place of tubercles. Length 2—3.5 mm.

Chews Landing, N. J., on cedar, entering in June; West Point, N. Y., May 23. District of Columbia under bark of juniper. Utopia, Fla., March 4. Kansas, mining under green bark on logs, stumps, tops of dying and injured red cedars and in their broken branches, May 23 (*Riley*). Eastern and Middle United States, Canada and New Mexico, on *Juniperus* and *Thuja*. (*Swaine.*) Excavates a single short, longitudinal egg gallery from the entrance burrow and basal chamber in the bark and surface of wood of juniper and eastern arbor vitæ, the mines as a rule being extremely regular and the wood very prettily sculptured. *P. serratus* Lec. (1868, 170) is a synonym of *dentatus.*

1066 (9172). Phlœosinus punctatus Lec., 1876, 381.

Differs only in the wider, more strongly punctured striæ, and narrower, less densely granulated and rugose intervals, with the second depressed on the declivity, shining, sparsely punctured and narrower than the adjacent ones. Front finely but distinctly carinate. Male, front excavated, excavation smooth at middle and anteriorly with a small tubercle. Tubercles on elytral declivity more prominent. Female, front not excavated but with a narrow median carina not reaching vertex; tubercles on elytral declivity smaller. Length 2 mm.

Occurs at Lake Superior and in Oregon (*LeConte*); Rocky Mountain region on *Libocedrus decurrens* and giant arbor vitæ, *Chamæcyparis lawsoniana* (*Swaine*); excavating a single straight or curved subtransverse gallery from a basal chamber in the living bark and surface of wood of giant arbor vitæ, incense cedar and Port Orford cedar. (*Hopkins.*)

III. Chramesus LeConte, 1868. (Gr., "rodent or gnawer.")

This genus, confined to North and South America, is distinguished by its oval, convex body, covered with erect short bristles, and remarkable antennæ, consisting of 5-jointed funicle and single-jointed club, attached to the funicle on its side. (Fig 137, F.) The club is compressed, pubescent and without trace of sutures on either side.

1067 (9154). CHRAMESUS ICORIÆ Lec., 1868, 168.

Oval, convex. Black, not shining, antennæ yellow; above clothed with short, stiff, ashy hairs, with rows of longer erect bristles on the intervals of elytra. Head large, prominent, concave in male, slightly convex in female, feebly punctured. Thorax broader than long, strongly narrowed in front, coarsely, not densely punctured, feebly bisinuate at base, rounded on sides. Elytra about twice as long as thorax, convex, obtusely rounded behind, basal margin acute and subserrate, very obsoletely striate, finely, not densely punctulate. Tibiæ gradually dilated, feebly serrate; tarsi with joints 1—3 very short, third scarcely dilated, fourth joint nearly as long as others united. Length 1.5 mm. (Fig. 153.)

Fig. 153. × 23. (After Swaine.)

Westville, N. J., June 16. (*Wenzel.*) Dubois and Posey counties, Ind., scarce; May 14—June 6. Described from specimens bred from twigs of hickory from Columbia, Pa. Occurs in Canada, Eastern, Middle and Western United States. (*Swaine.*) West Virginia, mining under partly green bark on cut branches and tops of dying hickory; adults, April, June, October. (*Hopkins.*)

Chramesus chapuisii Lec. (1876, 375) differs from *icoriæ* only by the intervals of elytra being densely clothed with small, thick scales and single rows of rather short bristles, and by the striæ being narrower and finely crenulate instead of coarsely punctured; the males with fringe of rather long, sparse and stiff bristles on antennal scape. It was described from a single Louisiana male and may occur in our territory.

IV. CARPHOBORUS Eichhoff, 1864. (Gr., "chaff" + "devour.")

Funicle 5-jointed; club 3-jointed, oval, thick, slightly longer than wide, transversely annulated, obtuse at tip, glabrous at base; eyes emarginate in front, mouth clothed with long coarse hair; thorax uniformly finely punctured; elytra with striæ of quadrate punctures, intervals finely roughened, the first and third elevated and serrate on the declivity; tibiæ moderately dilated, front one with two acute teeth near apex on outer side and long terminal hook on inner angle; first joint of tarsi minute, shorter than second, third cordate, not broader, emarginate, fourth as long as the others united. Two small species (1.5—2 mm.) of dull, densely punctured surface, clothed with very small yellowish scales represent the genus.

1068 (9177). CARPHOBORUS BIFURCUS Eich., 1868, 147.

Slender, cylindrical. Black, elytra brown, the whole body covered with fine, ashy scale-like hairs, without lustre, antennæ and legs ferruginous-yellow. Beak very short, front convex. Thorax convex, shorter than wide,

apical margin rounded, very finely granulately punctured, with a faint, smooth dorsal line. Elytra cylindrical, moderately slender, strongly punctate-striate, third interval moderately elevated toward tip, the first also elevated, the second slightly narrowed on declivity. Male with two small approximate tubercles on front, which is uniformly convex in female. Length 1.5 mm.

Occurs in pine from New Jersey and District of Columbia to Tennessee and Florida. The European species of the genus live polygamously on pine, the parent galleries being star-shaped. Packard found *bifurcus* at Montgomery, Ala., under bark of southern pine, making a long, sinuous, narrow primary gallery, from which rather short secondary galleries run out at nearly right angles.

1069 (9178). CARPHOBORUS BICRISTATUS Chap., 1869, 97.

Differs only in being larger, the greater elevation of the crests formed by the elevations of the first and third intervals and the consequently more evidently narrowed second interval. Length 1.8 mm.

Anglesea, New Jersey. Georgia, under pine bark.

V. POLYGRAPHUS* Erichson, 1836. (Gr., "much" + "writing.")

Small cylindrical species, narrowed in front, rounded behind; head of male with one, and sometimes two acute tubercles in front; female without acute tubercles in front; base of elytra straight, asperate. They occur in the eastern and northern states, in Canada and West Virginia, at times in incredible numbers, and constitute an important part of the insects destructive to spruce. (*Hopkins*, 1901-b.)

1070 (9157). POLYGRAPHUS RUFIPENNIS Kirby, 1837, 193.

Black, elytra dull red, legs, mouth and antennæ rufous; minutely punctured, hairs white, decumbent, like minute scales. Antennæ with long, strongly clavate scape, and 5-jointed funicle, first joint stout, as long as the others united, 2—5 gradually increasing in thickness, short, closely united, forming a conical mass; club strongly compressed, pubescent, without sutures, oval-pointed, with lower side less curved than upper and broader at base. Eyes divided, the two parts connected by a smooth corneous line, along which a few separate lenses may be scattered. Thorax simply, very thickly and minutely punctate. Elytra rugosely punctulate, scarcely striate, or with several rows of larger punctures; clothed with small stout scales and with rows of scarcely longer erect bristles, pubescence short, coarse, depressed and of a yellowish-gray color. Ventral segments nearly equal, first and fifth slightly longer. Tibiæ moderately dilated with three or four small teeth near tip, which is obliquely truncate, the inner angle slightly mucronate; tarsi slender, third joint not emarginate, fourth small but distinct, fifth as long as the others united. Length 2——2.5 mm.

*The generic name *Lepisomus* Kirby (1837) is also used for these species. We adhere to the name in use until the continuation of Dr. Hopkins' work fixes the generic position of each species.

Steuben Co., Ind.; June 15. Scotia Junction, Ont., July 22. (*Wenzel.*) Type from Lat. 65°. Ranges from Canada and Maine to Alaska, south to Georgia and Louisiana; common in the northern and Appalachian spruce region. In West Virginia adults occur from March to November; mining under green bark on logs, tops, stumps, broken branches, living, injured and dying spruce. Excavates three or four short, curved egg galleries from a large central chamber in the surface of the inner bark, through the bark and slightly grooving the wood of black, red and white spruce, and rare in balsam fir. (*Hopkins.*) By far the commonest secondary enemy of spruce in West Virginia and exceedingly common in Maine, its habit of infesting the tops of trees immediately after the middle portion of the trunk has been attacked by *Dendroctonus piceaperda* makes it one of the most efficient allies of the primary enemy.

P. nigriceps Kirby, said by LeConte to be synonymous with *rufipennis*, was described from Lat. 65° as smaller (2 mm.), rufous, head black, with elytral rows of punctures less conspicuous. Kirby's figure of *rufipennis* shows plainly the "rows of larger punctures" he described, and contradicts LeConte's description of the elytra as "scarcely striate."

1071 (9158). POLYGRAPHUS BREVICORNIS Kirby, 1837, 194.

Described as *Apate* (*Lepisomus*) and doubtfully referred to *Polygraphus* by LeConte; differs, if a *Polygraphus*, by the shorter antennæ with smaller club. Kirby's description reads: "Body black, covered with hoary hairs, above resembling scales; antennæ very short with a small knob, rufous; front without a tubercle, nose not impressed; elytra not striated; this species seems to indicate another section of the genus," meaning *Lepisomus*, which he created for *rufipennis*.

Locality, Hudson Bay Territory, Lat. 65°.

Tribe VII. HYLESININI.

Pronotum with anterior dorsal area commonly smooth; head exposed, not concealed from above; antennal club usually conical, rarely compressed; tarsi with third joint bilobed. (Fig. 139, G.)

KEY TO GENERA OF HYLESININI.

a. Funicle of antennæ 6-jointed. TOMICUS.*

aa. Funicle of antennæ 7-jointed.

b. Antennal club elongate-oval, pointed, slightly compressed. I. HYLESINUS.

**Tomicus piniperda* Linn. (1758, 563), a common European insect called "Waldgartner," is credited to North America by Hagedorn (1910) under *Myelophilus*. LeConte (1876) mentions (under genus *Blastophagus*) the accidental introduction of this species, erroneously described by him in 1868 as *Hylurgus analogus*, and compared it with the European *H. ligniperda* on the basis of an erroneously identified specimen. Headlee has recently called attention to its occurrence in Scotch fir standing in a nursery in New Jersey and figures its work in the terminal twigs, but it does not appear to be established in the United States.

bb. Antennal club oval, annulated, not compressed.
c. First, second and fifth ventral segments subequal, third and fourth shorter; front coxæ widely separated.
d. Club with first and second segments subequal, each as long as third and fourth united. (Fig. 137, D.) II. HYLASTINUS.
dd. Club with first segment much longer than second, nearly as long as second, third and fourth united. III. SCIERUS.
cc. First and fifth ventral segments longer than others; front coxæ narrowly separated or contiguous.
e. Mesosternum protuberant; third joint of tarsi dilated and bilobed; elytra separately rounded at base. IV. HYLURGOPS.
ee. Mesosternum not protuberant; third joint of tarsi about as wide as second, emarginate; bases of elytra in a straight line, not separately rounded. V. HYLASTES.

I. HYLESINUS Fabr., 1801. (Gr., "woods" + "scourge.")

The few species which we have are readily distinguished by the elytral pattern formed by the scales, being the only ornate species in the family.

KEY TO EASTERN SPECIES OF HYLESINUS.*

a. Bands of elytra oblique. 1072. ACULEATUS.
aa. Bands of elytra transverse. 1073. FASCIATUS.

1072 (9163). HYLESINUS ACULEATUS Say, 1823, 322; ibid, II, 181.

Cylindrical, elongate. Blackish-brown, thickly clothed with very short, ashy, squamiform hairs; thorax with side margins and a large spot on middle, and elytra with fifth interval from base to middle, blackish-brown; the color is then divided into two branches and prolonged obliquely to suture; humeri ferruginous as are also the antennæ and legs. Beak with groove, less developed than in preceding genera. Antennæ with 4-jointed club which is very slightly compressed, annulated, uniformly finely pubescent, oval-pointed. Head visible from above, more flattened in male, with large, transverse, finely granulated eyes. Elytra with rows of small, acute tubercles on intervals, visible, however, only in abraded specimens. Ventral segments convex, nearly equal, first and fifth somewhat longer, sutures deep and straight. Tibiæ dilated, serrate on outer margin; third joint of tarsi deeply bilobed. Length 2.2—3.4 mm.

Steuben, Marion, Vigo and Crawford counties, Ind., scarce; March 31—July 4; taken on the wing in early spring. Swarthmore, Pa., June. (*Wenzel.*) Stonington, Conn., May 14. Occurs in Canada and United States from Atlantic to Pacific. Food plant, ash, (*Fraxinus*). Dr. Hopkins states that this species excavates two long, transverse galleries from a central entrance burrow and side cavity on the living bark of injured, dying or felled ash trees, mining also under green bark of logs, stumps and dying trees. In West Virginia adults were noted June 20, July

**H. fraxini* Panz., cited by Hagedorn (1910), and *H. imperialis* Eich., cited by LeConte from Georgia and by Swaine from New York are omitted for lack of confirmation. *H. opaculus* Lec. is a synonym of *Hylurgops rufipes*. The name *Pteleobius* is used in Europe for *Hylesinus*.

24 and August 10. The European species *fraxini* has similar habits, the adults causing, according to Reitter, a growth on the bark by their nibbling, known as "Rindenrosen" (bark roses).

1073 (9164). HYLESINUS FASCIATUS Lec., 1868, 170.

Elliptical, convex. Brownish-black, slightly pubescent, densely covered with black opaque scales, fasciate with ashy as described below. Antennæ with club one-half longer than wide, regularly oval, less acute than usual, basal part less pubescent and more shining. Head concave, with a narrow, polished median line. Prothorax twice as wide as long, strongly narrowed in front, broadly rounded on the sides, near base and apex with bands of pale scales and hairs, the hinder one broadly interrupted at middle. Elytra with band before middle consisting of a large sutural spot and some smaller ones toward sides, a narrow, nearly complete band behind middle, composed of pale ashy scales; tip with a few ashy scales; striæ deep, punctured. Length 1.5 mm.

Crawford Co., Ind., rare; June 26. Clementon, N. J., May 20, infesting young shoots of healthy white ash. District of Columbia, rare, infesting twigs of *Fraxinus*. Described from York Co., Pa.

II. HYLASTINUS Bedel, 1888. (Derivative of *Hylastes*.)

Antennæ inserted at a distance from the eyes, the scrobes not reaching their front margin, second interspace over the deep side furrows of elytra towards the apex toothed; side pieces of middle and hind sterna thickly whitish pubescent; elytral intervals with rows of setæ but at most sparingly pubescent; thorax almost glabrous, punctate without rugæ, the elevation at base of elytra feebly arcuate. Contains one species, variously placed in *Hylesinus* and *Hylastes*, but considered by Reitter (1913) to present characters of sufficient importance to justify its generic separation.

1074 (11,255). HYLASTINUS OBSCURUS Marsh., 1802, 57.

Small, short, cylindrical. Dark brown. Beak broad, short but evident. Antennæ inserted in deep grooves at tip of beak, funicle 7-jointed, club 4-jointed, loose, first two joints large, equal, the last two smaller. Head visible from above. Thorax irregularly punctate with a trace of a middle line without tubercles or teeth. Elytra with deep striæ of punctures, intervals with a single row of setæ, declivity gradually oblique without teeth or tubercles, basal margin dentate, arcuate either side of scutellum. Front coxæ widely separated by a prolongation of prosternum; tibiæ all dentate on outer margin. Length 2.2—2.5 mm. (Fig. 154.)

Fig. 154. × 17. (After Forbes.)

Marion Co., Ind., scarce; April 26. A European insect, reported as destructively abun-

dant in central New York in 1878, which has spread westward to Indiana, and is also known on the Atlantic coast south to Pennsylvania. Apparently not yet known in New England or southward.* It passes the winter in the adult stage within the roots in which it has developed, leaving them in May and June to deposit eggs either in the crown of the plant or on the side of the root slightly below the crown. The larvæ burrow downward into the root, continuing to eat until August or October, when pupation takes place. The effect on the plant is similar to that of prolonged drought, but as the plants are exempt from attack in the first year, when the roots are scarcely large enough for the grubs, the remedy is summer fallowing as soon as the hay crop is removed. In this country the plant especially attacked has been red clover, *Trifolium pratense* L.; in Europe other species of clover and *Spartinum scoparium*, *Ononis natrix* and *Ulex europæus* are also cited as food plants. *H. trifolii* Müll. is a synonym.

III. Scierus Lec., 1876.

Contains a single species, included by Hagedorn (1910) as a subgenus of *Hylastes* but separated by Swaine (1909) on account of first joint of antennal club being nearly as long as joints 2, 3 and 4 united.

1075 (9188). Scierus annectens Lec., 1876, 390.

Oblong-cylindrical. Dark brown, opaque, thinly clothed with very short, depressed yellow hairs. Beak flat, punctured and hairy, about twice as wide as long, not impressed or carinate. Antennæ with 7-jointed funicle and 4-jointed ovate pointed club, the first joint of which is smooth, shining and nearly as long as the others united. Head convex, visible from above. Prothorax one-third wider than long, rounded on the sides, narrowed in front, densely and strongly punctured, with a narrow dorsal line, sometimes obsolete. Elytra wider than thorax, basal margin rather acute, finely serrate; striæ deeply impressed, punctured, intervals wider than striæ, scabrous with transverse rugosities, becoming asperate on sides toward tip; intervals also become more convex on declivity, third and ninth uniting near tip and joining the first. Beneath coarsely and sparsely punctured and pubescent. First and second ventral segments equal, third and fourth shorter, fifth as long as second. Legs lighter brown, tibiæ dilated and broadly serrate. Length 3.6 mm.

Described from Anticosti Island, British Columbia, and Vancouver. Reported also from Maine, but apparently not a well known species. Food plant, *Picea*.

*Circ. No. 67, U. S. Div. Ent., Webster, is especially devoted to this insect.

IV. Hylurgops Lec., 1876. (Gr., "wood" + "destroyer.")

Treated as a subgenus of *Hylastes* by Hagedorn (1910) but retained as distinct by Swaine and by Reitter, the differences being as given in key, and in fact used by Erichson (1836) in separating the species included. As pointed out by LeConte, they are quite different in form from true *Hylastes*, and resemble *Dendroctonus*, the prothorax being more narrowed forwards and more finely and densely punctured, while the bases of elytra are separately rounded. (Fig. 137, G.)

1076 (9199). Hylurgops pinifex Fitch, Trans. N. Y. Agr. Soc., 1851, 43.

Stout, cylindrical, narrowed in front. Deep chestnut red or black, tinged with chestnut, with a thin, fine, short beard on hind part of elytra; under surface black. Beak carinate, front transversely impressed; antennæ with 7-jointed funicle and 4-jointed club, the first joint of which is as long as the others united. Head convex, visible from above. Thorax broader than long, narrowed in front, slightly tubulate, with fine dorsal line, finely and densely punctured. Basal margin of elytra subacute and subserrate, separately rounded at base, apex slightly broader than base, deeply striate with quadrate punctures; intervals of striæ with series of small tubercles and short yellow hairs in posterior half. Prosternal ridges acute, mesosternum protuberant, first and fifth ventral segments distinctly longer than the others. Front coxæ contiguous; legs dark chestnut, tibiæ with fine denticulations along outer margin, third joint of tarsi dilated and bilobed. Length 4.5—5 mm.

Laporte Co., Ind., scarce; August 26. Described from New York, the type taken from pine lumber in mill yards early in May; mining under bark of spruce stumps in November in Maine. (*Packard.*) Lake Superior, Canada, Ohio, New Jersey, attacking pine, mining, in green bark or dying trees. Treated by most American authors as a synonym of *glabratus* but retained as distinct by Swaine.

1077 (9199). Hylurgops glabratus Zett., 1828, 343.

Fig. 155. × 8. (After Felt.)

Male wth slightly deeper transverse impressions in front and with a longer longitudinal elevated line above base of mandibles. Female with frontal transverse line present, but shorter in some individuals and obsolete in others. (Fig. 155.)

This is a European insect, very similar to the preceding and its citation in our lists perhaps results from applying the European name to our insect. It occurs throughout Europe under pine bark, eating long tunnels in the bast, the closely placed larval tunnels

become confluent along the middle, and only the pupal chambers are isolated. Under the name *glabratus* (with *pinifex* cited as a synonym, Hopkins (1893-a) gives dates for appearance of adults May 3—June 29, young larvæ, June 13, full grown larvæ, July 14, pupæ, October 4. In West Virginia it mines under green bark at base of dying pines, also on logs and stumps.

1078 (9166). HYLURGOPS RUFIPES* Eichhoff, 1868, 147.

Cylindrical. Brownish-black, opaque, thinly clothed with short, stiff yellowish hairs. Has a deceptive resemblance to *Phlœophthorus frontalis*, separable, however, by the antennæ having 7-jointed funicle and club subovate, nearly twice as long as wide, and more shining toward base. Head convex, visible from above, thickly punctured; beak short. Thorax nearly as long as wide, narrowed in front, sides subsinuate near tip, densely but not finely punctured, with a very narrow faint dorsal carina. Elytra with striæ composed of deep subquadrate punctures, intervals narrow, rough with transverse rugosities. Length 2—2.5 mm.

Frequent throughout Indiana, Jan. 17 Oct. 18; on fungus-covered elm stumps, under bark. Atco, N. J., April 9, on wild cherry. (*Wenzel.*) Described from Pennsylvania by LeConte. New York and West Virginia, northward to Canada. Food plants, *Ulmus* and *Fraxinus*. *H. opaculus* Lec. (1868, 170) is a synonym.

V. HYLASTES Erichson, 1836. (Gr., "woodman.")

This genus, after separating those which precede it, includes those Ipini in which the special modifications of the subfamily are least developed and the resemblance to Cossoninæ is greatest. The antennal grooves of the short, stout beak, the dilated, emarginate but not bilobed third joint of tarsi, the exserted prominent head, the absence of tubercles and spines on thorax and elytra, are all characteristic of its position near one end of the family. The characters which specially separate it from the preceding genera are the contiguous front coxæ; first and fifth ventral segments longer than the others, mesosternum not protuberant, and particularly the base of elytra in a straight line, not separately rounded as in *Hylurgops*.

KEY TO EASTERN SPECIES OF HYLASTES.

a. Beak carinated.

b. Thorax densely coarsely punctate; elytra subdepressed, striæ coarsely punctate, intervals narrow, granulate-rugose. 1079. PORCULUS.

bb. Thorax less deeply punctate; disc of elytra convex, narrow; striæ finely punctate, intervals wider, coarsely transversely rugose. 1080. SALEBROSUS.

*In recent correspondence Dr. Hopkins refers this species to *Hylesinus*.

aa. Beak not carinated; small, slender, dark brown, elytra coarsely punctured in rows, with rows of short, suberect hairs.
c. Intervals of elytra opaque, rough with small granules. 1081. TENUIS.
cc. Intervals of elytra somewhat shining, rugose. 1082. EXILIS.

H. nigrinus Mann, mentioned by Evans (1895) and *H. scobinosus* Eich. (1868, 146) are omitted as doubtfully occurring in eastern America.

1079 (9192). HYLASTES PORCULUS Erichs., 1836, 49.

Cylindrical, stout, narrowed in front. Nearly black, except feet and antennæ which are chestnut red. Beak short, stout, obliquely excavated on side for reception of antennæ, which have short, 7-jointed funicle, small oval, distinctly annulated club, of which the basal half is shining and nearly glabrous; head visible from above. Thorax deeply excavated for reception of head, deeply punctured, marked with a distinct smooth dorsal line. Tibiæ broadly dilated and serrate; first and fifth ventral segments conspicuously longer than others. Length 4—4.5 mm.

Malaga, N. J., April 30, in pine roots. (*Wenzel.*) Occurs in the Atlantic coast states from New York to Florida, west to Michigan, Colorado and Alaska, "in bark of dying pine." (*Hopkins.*) Fitch's type was captured the middle of July in his yard. *H. carbonarius* Fitch and *cavernosus* Zimm. are synonyms.

1080 (——). HYLASTES SALEBROSUS Eich., 1868, 146.

Resembles the preceding so closely that the differences only will be given. Zimmerman says "prothorax slightly longer than wide [but shorter than in *porculus*], less deeply punctate, elytra very deeply striate, striæ less evidently punctured, intervals very deeply rugose," Eichhoff (1896) says "disk of elytra strongly convex, fine punctures at the bottom of the narrow elytral striæ, and with coarsely transversely rugose interstices, which are wider than in the allied species." Length 4.5—5 mm.

Occurs in Atlantic States and Eastern Canada. Food plant, unknown. This is the *porculus* of LeConte (1876), he having erred in identification. *H. scabripennis* Zimm. is a synonym.

1081. (9196). HYLASTES TENUIS Eich., 1868, 147.

Slender, dull black, tolerably thickly clothed with short yellow hairs. Beak not carinated, broadly transversely impressed near tip, antennæ and head as in preceding. Thorax longer than wide, thickly punctured, with a smooth, slightly elevated line, somewhat indistinct, nearly straight on the sides, apex broadly, base feebly rounded. Elytra with broad flat striæ thickly set with transverse punctures, intervals very narrow and elevated; tibiæ coarsely serrate. Length 2—3.75 mm.

Sanford and Dunedin, Florida, scarce. January 14—Nov. 1; taken beneath bark of pine. Occurs in Atlantic States, from Quebec to Florida and Texas; also in California. Food plant,

pine. With this species, following Swaine, we include *H. gracilis* Lec., described from California, as a synonym, though held a separate species by some Coleopterists.

1082 (9197). Hylastes exilis Chap., 1869, 76.

Nearly related to *tenuis*, but thorax more coarsely punctured, intervals of elytra not granulate, but rugosely punctured and less opaque. Length 2.5 mm.

Occurs in Florida. Food plant unknown.

*

* *

Of the 1084 species of Rhynchophora described in this work, as occurring in the United States and Canada east of the Mississippi River, 419 have been taken in Indiana, while 146 others have a known range which indicates their very probable occurrence in that State. In the senior author's "Coleoptera of Indiana" 2535 species (exclusive of the Rhynchophora) were fully described and recorded, and 777 others were briefly described and listed as probably occurring in the State. In the two works we have, therefore, a total of 2954 described species of Coleoptera from Indiana, and a tentative list of 923 additional species which probably occur. There is very little doubt but that more than 4,000 species really exist within the State, as new ones are continually being discovered and the known range of many others extended.

From Florida 441 species of the Rhynchophora herein described have been recorded. Of these 193 are semitropical or tropical species, 169 of which are recorded from Florida alone, the other 24 only from Georgia and Florida. Only 9 species are recorded exclusively from Georgia. A number of the Floridian species, especially some of those from the Everglade Region and the southern keys, are tropical forms which occur also in the West Indies or other countries. A few are known also from Texas, New Mexico or Arizona, but no one of the 169 has been recorded elsewhere from east of the Mississippi. A number of them, however, doubtless occur in what is known as the Gulf Strip of the Lower Austral Life Zone, along the southern edge of Alabama, Mississippi and Louisiana.

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Biological references in European works, especially those relating to species that do not occur in our territory, have not been specifically quoted in this work, though the data thereby given may be covered by the summary of the habits of the genus. The student especially interested in the biology of our species will find many suggestive statements, drawn from European species in the writings of Ferris, Bedel, Kleine and other foreign authors.

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